Received(Date): Fri, 23 Apr 2010 16:22:48 -0400
From: "Michael S. Gallagher" <Michael.S.Gallagher@noaa.gov>
Subject: Update: ICC Coordination Call at 1500 today - RE: Oil Rig Explosion -GOM
To: Roy Crabtree <Roy.Crabtree@noaa.gov>, Buck Sutter <Buck.Sutter@noaa.gov>,Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>,Theo Brainerd <Theo.Brainerd@noaa.gov>,Lisa Desfosse <Lisa.Desfosse@noaa.gov>,Alan Risenhoover <Alan.Risenhoover@noaa.gov>,Mark Paterni <Mark.Paterni@noaa.gov>, Steven Wilson <Steven.Wilson@noaa.gov>
Cc: Brian Brown F/MB <Brian.Brown@noaa.gov>, John Oliver <John.Oliver@noaa.gov>
Michael_S_Gallagher.vcf

The 1500 EDT ICC conference call on the oil rig explosion and associated release of oil revealed no significant changes from this morning's situation. Deployed remotely operated vehicles with sonar capability do not detect continued release of oil from the well head.

"From what we have observed yesterday and through the night, we are not seeing any signs of release of crude in the subsurface area. However we remain in a 'ready to respond' mode and are working in a collaborative effort with BP, the responsible party, to prepare for a worst-case scenario," Rear Admiral Mary Landry, commander of the Eighth Coast Guard District stated early Friday morning.

On-scene cleanup efforts continue with booms, skimmers and dispersant deployed from aircraft. Efficacy of cleanup ops is expected to be degraded with passage of a cold front and heavier weather over the weekend. Floating oil is not expected to reach any shorelines before Tuesday, if at all. Most likely impacted shorelines would be Louisiana and Mississippi.

At the moment, the ICC does not expect to conduct calls or assign taskers over the weekend, but does ask us all to be ready to respond very quickly if the well starts leaking. Please monitor e-mail and mobile phones over the weekend.

You can get updates on the situation from OR&R at; https://responselink.orr.noaa.gov/hotline/incidents/8220. Log in with NOAA email name and password.

Have a good weekend.

Michael Gallagher

CAPT, NOAA

National Marine Fisheries Service
Executive Officer

1315 East West Highway, Room 14556
National Oceanic & Atmospheric Administration
Silver Spring, MD 20910 3282

301 713 2239 x182 (Work)
206 383 5731 (Cell)

michael.s.gallagher@noaa.gov (Internet)

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Michael Gallagher

Name

Family:	Gallagher
First:	Michael
Middle:	
Prefix:	
Suffix:	

Organization
National Marine Fisheries Service
Executive Officer

Address (Domestic)

P.O. Address:	1315 East West Highway, Room 14556
Extended Address:	
Street:	National Oceanic & Atmospheric Administration
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301 713 2239 x182

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206 383 5731

Version
2.1

Received(Date): Mon, 03 May 2010 07:02:45 -0400
From: Steve murawski <Steve.Murawski@noaa.gov>
Subject: [Fwd: Acoustic detection of oil, Deepwater Horizon Oil Spill]
To: William Conner <William.Conner@noaa.gov>,Dave Westerholm <Dave.Westerholm@noaa.gov>,"Kate.Clark" <Kate.Clark@noaa.gov>, Lisa Desfosse <Lisa.Desfosse@noaa.gov>,Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>

On the issue of detection of the plume below the picnoclyne via acoustics. ME 70 is a multibeam sonar available on the newest NOAA FSVs,

Steve

-------- Original Message --------

Subject: Acoustic detection of oil, Deepwater Horizon Oil Spill
Date: Mon, 03 May 2010 11:04:12 +0200
From: Olsen, Erik <erik.olsen@imr.no>
To: Steve murawski <Steve.Murawski@noaa.gov>
CC: Nepstad Tore <tore.nepstad@imr.no>, "Svendsen, Einar" <einar.svendsen@imr.no>, "Misund, Ole Arve" <ole.arve.misund@imr.no>, Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>, Godoe Olav Rune <olav.rune.godoe@imr.no>, Serigstad, Bjørn <bjorn.serigstad@imr.no>, "Knutsen, Tor" <tor.knutsen@imr.no>, Klungsøyr Jarle <jarle.klungsoeyr@imr.no>, "Handegard, Nils Olav" <nilsolav@IMR.no>
References: <88F4CF342351F142B1B20E937579EA37304BC5003C@exmbx1.imr.no> <4BDB7237.80301@noaa.gov> <8211B409838E314F8BA4A17409E10BEA5AE427CA96@exmbx1.imr.no> <4BDC7F75.6060201@noaa.gov>

Hi again Steve,

Below is an answer written by Dr. Olav Rune Godø to the question on the possibility to detect oil/gas with acoustic equipment:

I have studied your correspondence with Steve on the oil spill in the Gulf. The controlled studies done in the Norwegian Sea should be properly referred to. You should keep in mind that there might be some difficulties in drawing parallels as the releases here were a combination of diesel and methane. However, all substances with density/sound speed differences will be detectable

by acoustics, consequently also crude oil in sea water. The question is what frequency and sensitivity can be obtained in an investigation at various depths in practice. You will always be dependent of high concentrations of oil in the neighborhood of the release site and before the oil reach the surface. For detection to 1500 m and deeper demand frequencies that reach that far; i.e. 38 kHz or lower. From a silent platform with a good signal to noise relation EK60 38 kHz might be OK, but 18 kHz might be preferable. ME 70 working on 70-120 kHz will be good for detection of oil ascending towards surface but will not reach to 1500m. My understanding of the challenge based on Steve's description is that there is a depot of released oil at about 1500m trapped under the pycnoline. From a research vessel 18 and 38 kHz might be tried. A better understanding of the detectability of oil in the actual situation can only be answered through calculation based on actual measurements of temperature and salinity of the water masses surrounding the oil. As higher frequencies normally will give better result the use of AUV/ROV should be considered mapping the oil depot below 1500m.

You can also contact Olav Rune directly by:

olavrune@imr.no, phone: +47 55 23 86 75, mobile:+47 41 47 91 76

Best Regards

Erik Olsen

Received(Date): Mon, 03 May 2010 09:43:42 -0500
From: "Perry A. Thompson" <Perry.A.Thompson@noaa.gov>
Subject: Re: [Fwd: [Fwd: Acoustic detection of oil,Deepwater Horizon Oil Spill]]
To: Lisa Desfosse <Lisa.Desfosse@noaa.gov>
Perry_A_Thompson.vcf

Lisa,

The Shimada is south of the Keys and coming into the Gulf. If we want to make an ME70 pass then I would recommend that the Shimada do it before it comes into Pascagoula.

Perry

Lisa Desfosse wrote:
> The Pisces or Shimada may be asked to play a part in this so read up.
> Will keep you informed as I know more. Not sure what our role might be
> but lets be ready.
>
> Lisa
>
> ---
>
> Subject:
> [Fwd: Acoustic detection of oil, Deepwater Horizon Oil Spill]
> From:
> Steve murawski <Steve.Murawski@noaa.gov>
> Date:
> Mon, 03 May 2010 07:02:45 -0400
> To:
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> <Dave.Westerholm@noaa.gov>, "Kate.Clark" <Kate.Clark@noaa.gov>, Lisa
> Desfosse <Lisa.Desfosse@noaa.gov>, Bonnie Ponwith
> <Bonnie.Ponwith@noaa.gov>
>
> To:
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> <Dave.Westerholm@noaa.gov>, "Kate.Clark" <Kate.Clark@noaa.gov>, Lisa
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> To: Steve murawski <Steve.Murawski@noaa.gov>
> CC: Nepstad Tore <tore.nepstad@imr.no>, "Svendsen, Einar"
> <einar.svendsen@imr.no>, "Misund, Ole Arve" <ole.arve.misund@imr.no>,
> Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>, Godoe Olav Rune
> <olav.rune.godoe@imr.no>, Serigstad, Bjørn <bjorn.serigstad@imr.no>,
> "Knutsen, Tor" <tor.knutsen@imr.no>, Klungsøyr Jarle
> <jarle.klungsoeyr@imr.no>, "Handegard, Nils Olav" <nilsolav@IMR.no>

> References:
> <88F4CF342351F142B1B20E937579EA37304BC5003C@exmbx1.imr.no>
> <4BDB7237.80301@noaa.gov>
> <8211B409838E314F8BA4A17409E10BEA5AE427CA96@exmbx1.imr.no>
> <4BDC7F75.6060201@noaa.gov>
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> olavrune@imr.no <mailto:olavrune@imr.no>, phone: +47 55 23 86 75,
> mobile:+47 41 47 91 76
>
> Best Regards
>
> Erik Olsen
>

Perry A. Thompson

SEFSC Vessel Coordinator

Mississippi Laboratories
NOAA/NMFS

705 Convent AVe
Pascagoula, MS 39567
U.S.

228/762-4591, ext 168 (Work)
228/769-9200 (Fax)
228/219-1319 (Cell)

Perry.A.Thompson@noaa.gov (Internet)

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Perry A. Thompson

Name

Family:	Thompson
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228/769-9200

Telephone Number (Cell)
228/219-1319

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FALSE

Version
2.1

Received(Date): Mon, 03 May 2010 10:42:46 -0500
From: Joanne Lyczkowski-Shultz <Joanne.Lyczkowski-Shultz@noaa.gov>
Subject: [Fwd: Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]]]
To: Glenn Zapfe <Glenn.Zapfe@noaa.gov>
Cc: "Karen.Mitchell" <Karen.Mitchell@noaa.gov>
Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]].eml
Joanne_Lyczkowski-Shultz.vcf

Olivia may be put to good use yet.....

Received(Date): Mon, 03 May 2010 09:40:15 -0400
From: Jon Hare <jhare@mola.na.nmfs.gov>
Subject: Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]]
To: Kate.Clark@noaa.gov
Cc: Tamara Holzwarth_Davis <tholzwar@mercury.wh.whoi.edu>,Elisabeth Broughton <Elisabeth.Broughton@noaa.gov>,Thomas Noji <Thomas.Noji@noaa.gov>,Wendy Gabriel <wgabriel@mercury.wh.whoi.edu>,Russell Brown <rbrown@mercury.wh.whoi.edu>,Joanne Lyczkowski-Shultz <Joanne.Lyczkowski-Shultz@noaa.gov>

Dear Kate,

The Northeast Fisheries Science Center has a 1m2 MOCNESS unit. I am not certain what the depth limit is, but will find out.

Also, the SEFSC lab in Pascaguola, MS has one: contact Joanne Lyczkowski-Shultz (copied here).

Please let me know if I can answer any other questions.

Cheers

Jon

Russell Brown wrote:
> Can we get a response from Oceanography back to Kate Clark
> (Kate.Clark@noaa.gov) with a cc to Steve Murawski quickly? This
> request came directly to me last night and is related to Gulf of
> Mexico oil spill response.
>
> Thanks;
>
> Russ
>
>
> ---
>
> Subject:
> [Fwd: Deep sea dispersed plume monitoring]
> From:
> Steve murawski <Steve.Murawski@noaa.gov>
> Date:
> Sun, 02 May 2010 22:40:00 -0400
> To:
> Russell Brown <Russell.Brown@noaa.gov>
>
> To:
> Russell Brown <Russell.Brown@noaa.gov>
> CC:
> Lisa Desfosse <Lisa.Desfosse@noaa.gov>
>
>
> Russell,
>
> Do you have a Mocness protocol for deep water? If so can you send to
> Kate?
>
> tx

>
> Steve
>
> -------- Original Message --------
> Subject: Deep sea dispersed plume monitoring
> Date: Sun, 02 May 2010 21:27:05 -0400
> From: Kate.Clark <Kate.Clark@noaa.gov>
> To: Steve.Murawski@noaa.gov
>
>
>
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> of the sampling strategy. Thank you for your input.
>
> To answer your questions. We will certainly be collecting discrete water
> samples with a Niskin rosette. We will be doing benthic grab sampling as
> well, likely a Ponar. We have requested several ADPC units. In addition,
> we have requested two fluorometers, a CTD w/ DO and turbidity, a
> spectrofluorometer, and a GCFID.
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> Per the pelagic biota sampling - do you have a sampling protocol you
> would recommend for MOCNESS?
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> We are looking to have a near final plan early tomorrow morning. Look
> forward to hearing from you,
>
> Kate
>
> --
> Kate Clark
> Regional Resource Coordinator
> NOAA Assessment and Restoration Division
> 28 Tarzwell Drive
> Narragansett, RI 02882
> v: 401-782-3235
> f: 401-782-3201
> www.darrp.noaa.gov
>
>
>

--
Jon Hare
NOAA NMFS Northeast Fisheries Science Center
Chief, Oceanography Branch
28 Tarzwell Drive
Narragansett, RI 02882
USA

jon.hare@noaa.gov
cell: 908-433-3967
PLEASE NOTE NEW PHONE NUMBER

Joanne Lyczkowski-Shultz

Research Fishery Biologist

Southeast Fisheries Science Center/Mississippi Labs

SEAMAP Plankton Team Leader

3209 Frederic St.
Pascagoula, MS 39567
USA

228 549-1633 (Work)

Joanne.Lyczkowski-Shultz@noaa.gov (Internet)

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Joanne Lyczkowski-Shultz

Name

Family:	Lyczkowski-Shultz
First:	Joanne
Middle:	
Prefix:	
Suffix:	

Organization
Southeast Fisheries Science Center/Mississippi Labs
SEAMAP Plankton Team Leader

Address

P.O. Address:	
Extended Address:	
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Locality:	Pascagoula
Region:	MS
Postal Code:	39567
Country:	USA

Electronic Mail Address (Internet)
Joanne.Lyczkowski-Shultz@noaa.gov

Title
Research Fishery Biologist

Telephone Number (Work)
228 549-1633

Comment
Please note new office phone number

Version
2.1

Received(Date): Mon, 03 May 2010 10:56:46 -0500
From: Joanne Lyczkowski-Shultz <Joanne.Lyczkowski-Shultz@noaa.gov>
Subject: [Fwd: Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]]] ourMOCNESS may be needed
To: Lisa Desfosse <Lisa.Desfosse@noaa.gov>
Cc: "Karen.Mitchell" <Karen.Mitchell@noaa.gov>,Perry A Thompson <Perry.A.Thompson@noaa.gov>,Glenn Zapfe <Glenn.Zapfe@noaa.gov>
Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]].eml
Joanne_Lyczkowski-Shultz.vcf

Our MOCNESS may get pulled into service.
I am not certain of its depth limit.
Glenn do you know.....?
I'm checking the paperwork I have on our unit.
Joanne

Received(Date): Mon, 03 May 2010 09:54:49 -0400
From: Jon Hare <jhare@mola.na.nmfs.gov>
Subject: Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]]
To: Kate.Clark@noaa.gov
Cc: Tamara Holzwarth_Davis <tholzwar@mercury.wh.whoi.edu>,Elisabeth Broughton <Elisabeth.Broughton@noaa.gov>,Thomas Noji <Thomas.Noji@noaa.gov>,Wendy Gabriel <wgabriel@mercury.wh.whoi.edu>,Russell Brown <rbrown@mercury.wh.whoi.edu>,Joanne Lyczkowski-Shultz <Joanne.Lyczkowski-Shultz@noaa.gov>

Dear Kate,

We have two options regarding depth limit. 1) 1100 m and 2) 3500 m. In both cases, we currently have parts at the manufacturer for maintenance and if the equipment is needed, we would need a little time to pull things together.

Cheers

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>> Date:
>> Sun, 02 May 2010 22:40:00 -0400
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>> Russell,
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>> Subject: Deep sea dispersed plume monitoring
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>> From: Kate.Clark <Kate.Clark@noaa.gov>
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>>
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228 549-1633

Comment
Please note new office phone number

Version
2.1

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From: Glenn.Zapfe@noaa.gov
Subject: Re: [Fwd: Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]]] ourMOCNESS may be needed
To: Joanne Lyczkowski-Shultz <Joanne.Lyczkowski-Shultz@noaa.gov>
Cc: Lisa Desfosse <Lisa.Desfosse@noaa.gov>,"Karen.Mitchell" <Karen.Mitchell@noaa.gov>,Perry A Thompson <Perry.A.Thompson@noaa.gov>
Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]].eml

Looking at the spec sheets for the conductivity and temperature probes
on the MOCNESS....we can go to 6800m. I'm going to try and contact Erich
(the manufacturer) to double check because there are some other
instruments that might not be rated for those depths. I will get back to
you as soon as I hear back.
Thanks,
Glenn

----- Original Message -----
From: Joanne Lyczkowski-Shultz <Joanne.Lyczkowski-Shultz@noaa.gov>
Date: Monday, May 3, 2010 3:56 pm
Subject: [Fwd: Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]]]
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>> --
>> Kate Clark
>> Regional Resource Coordinator
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>>
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>

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Jon Hare
NOAA NMFS Northeast Fisheries Science Center
Chief, Oceanography Branch

28 Tarzwell Drive
Narragansett, RI 02882
USA

jon.hare@noaa.gov
cell: 908-433-3967
PLEASE NOTE NEW PHONE NUMBER

Looking at the spec sheets for the conductivity and temperature probes on the MOCNESS....we can go to 6800m. I'm going to try and contact Erich (the manufacturer) to double check because there are some other instruments that might not be rated for those depths. I will get back to you as soon as I hear back.
Thanks,
Glenn

----- Original Message -----
From: Joanne Lyczkowski-Shultz <Joanne.Lyczkowski-Shultz@noaa.gov>
Date: Monday, May 3, 2010 3:56 pm
Subject: [Fwd: Re: [Fwd: [Fwd: Deep sea dispersed plume monitoring]]] our MOCNESS may be needed

> Our MOCNESS may get pulled into service.
> I am not certain of its depth limit.
> Glenn do you know.....?
> I'm checking the paperwork I have on our unit.
> Joanne
>

Received(Date): Mon, 03 May 2010 16:48:32 -0500
From: Andrew David <andy.david@noaa.gov>
To: Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>
Cc: Guy Davenport <Guy.Davenport@noaa.gov>
Subject: Diving in oil

Bonnie,

I'm trying to think ahead on the oil spill issue and can foresee an inquiry about the NOAA Diving Program's ability to put people into the water for damage assessments/mitigation. Contaminated water diving is a very complicated procedure but one we have been evaluating for some time. The NDP submitted a PPBES proposal a couple of years ago to develop this technology, but the funding request was denied. At this time NOAA Diving does not have any capability to conduct contaminated water diving operations. If we were directed to spin up a program, the response time would still be a matter of months, even if full funding were provided. This would almost certainly involve the large NOAA ships as the small boats would not be capable of supporting the decontamination procedures required. The climate in the Gulf is also a concern as divers would need to be outfitted in drysuits with sealed hoods in order to be completely protected from the contaminated water and hyperthermia would be a significant safety risk to the divers wearing this equipment.

AWD

--
Andrew W. David

Research Fishery Biologist
Line Office Diving Officer (LODO), NOAA Fisheries

NOAA Fisheries
Panama City Laboratory
3500 Delwood Beach Road
Panama City, FL 32408
[Tel] (850) 234-6541 ext 208
[Fax] (850) 235-3559
[Cell] (850) 819-4067
[E-Mail] andy.david@noaa.gov

Received(Date): Wed, 05 May 2010 13:19:33 -0700
From: Dave Dinsmore <Dave.Dinsmore@noaa.gov>
Subject: Re: [Fwd: Re: Diving in oil]
To: Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>
Cc: Andrew David <Andy.David@noaa.gov>
CWD Budget.doc
Contaminated water diving proposal_final.doc

Dr. Ponwith,

Attached is the PPBES submission that included funding for developing a contaminated water diving capability. Also attached is a more detailed proposal for a CWD program. Neither was funded.

Regards, Dave

Andrew David wrote:
> Dave - Can you send Dr. Ponwith (Center Director, SEFSC) the PPBES
> proposal for contaminated water diving? Thanks. AWD
>
>
> ---
>
> Subject:
> Re: Diving in oil
> From:
> Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>
> Date:
> Mon, 03 May 2010 18:04:44 -0400
> To:
> Andrew David <Andy.David@noaa.gov>
>
> To:
> Andrew David <Andy.David@noaa.gov>
> CC:
> Guy Davenport <Guy.Davenport@noaa.gov>
>
>
> Excellent - I'll add this to the future capabilities section of our
> oil spill budget. Please forward the PPBES proposal to me as a
> strawman budget for this. I know it will be a couple of years
> outdated, but it can be a place holder while you folks have a chance
> to revisit it.
>
> bjp
>
> Andrew David wrote:
>> Bonnie,
>>
>> I'm trying to think ahead on the oil spill issue and can foresee an
>> inquiry about the NOAA Diving Program's ability to put people into
>> the water for damage assessments/mitigation. Contaminated water
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>>
>> AWD
>>

--
David A. Dinsmore
NOAA Diving Program Manager

NOAA Diving Center
7600 Sand Point Way, NE
Seattle, WA 98115-0070
(206) 526-6705 Office
(206) 669-9842 Cell
(206) 526-6506 Fax

"Some men see things as they are and ask why.
Others dream things that never were and ask why not."
-- George Bernard Shaw

Fleet Services & NOAA Marine and Aviation Operations
Program Adjustment Request

Title: Improving NOAA's Diving Safety & Operational Capabilities

Date	12-Apr-07	**Version**	1		
Division or Center	Dive Center	**Contact Person**	Dave Dinsmore	**Phone**	206-526-6705
Fund Type	ORF	**Continuation of Previous Work?**			Yes

Current	Program ($k)	Program Adjustment ($k)	Number of NOAA Personnel	Number of Other Personnel	Number of NOAA Corps	Number of Wage Mariners
3 years	$964.1					
2 years	$964.1					
1 year	$964.1					
Current Planning Year = **2010**	$964.1	$1270.0	1.0	0.0	0.0	0.0
+1 year	$964.1	$547.0	1.0	0.0	0.0	0.0
+2 years	$964.1	$458.0	1.0	0.0	0.0	0.0
+3 years	$964.1	$342.0	1.0	0.0	0.0	0.0
+4 years	$964.1	$635.0	2.0	0.0	0.0	0.0

1. **Strategic Plan Element** (What Mission Goal, Outcome, Performance Objective and Goal Strategy will this program adjustment address?)

 This program adjustment directly supports all five NOAA Programs including: Ecosystems, Climate, Weather & Water, Commerce & Transportation, and Organization Excellence & Mission Support.

 More specifically, this adjustment supports the following NOAA Programs:
 ECOSYSTEM: Habitat, Corals, Coastal & Marine Resources, Protected Species, Fisheries Management, Aquaculture, Enforcement, Ecosystem Observation, Ecosystem Research
 CLIMATE: Climate Observations & Analysis, Regional Decision Support
 WEATHER & WATER: Coasts, Estuaries and Oceans, Environmental Modeling, Tsunami
 COMMERCE & TRANSPORTATION: Marine Transportation Systems, Marine Weather, Geodesy, Emergency Response, Surface Weather
 MISSION SUPPORT: Marine Operations & Maintenance, Homeland Security

Fleet Services & NOAA Marine and Aviation Operations
Program Adjustment Request

Title: Improving NOAA's Diving Safety & Operational Capabilities

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Fund Type	ORF	**Continuation of Previous Work?**			Yes

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+3 years	$964.1	$342.0	1.0	0.0	0.0	0.0
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 MISSION SUPPORT: Marine Operations & Maintenance, Homeland Security

The Mission Goal Program / Line Office POCs who request and / or support this adjustment are the members of the NOAA Diving Safety Board (one representative each from NOS, NMFS, OAR and NMAO). The Safety Board functions as the 'board of directors' for the NOAA Diving Program. Members of the Safety Board are appointed by the Assistant Administrators of each Line Office and serve as the official representative of that LO.

2. **Mission Needs Analyses:** (Explain the benefits of this program adjustment to NMAO, NOAA, and the nation. What problem will be solved? How does this problem affect other NOAA Programs / Line Offices or NOAA as a whole? Why is this program adjustment the best solution?)

 Diving accident management

 NOAA divers work throughout the oceans and inland waters of the world in conditions varying from the crystal clear water of a pristine marine sanctuary to the murky and contaminated water of a congested harbor. Some of the dives performed in these locations are considered higher risk due to the remoteness of the dive site (e.g., Northwest Hawaiian Islands, Caribbean, American Samoa) and the depth of the dives. Such diving operations have increased risks for injury to the divers and adequate and appropriate safeguards must be in place to respond to diving emergencies when and wherever they may occur.

 NOS and NMFS have a number of research programs that require diving in remote locations and/or deep water. Four such programs are the Flower Garden Banks National Marine Sanctuary, the Pacific Island Fisheries Science Center, the Center for Coastal Fisheries & Habitat Research, and the Thunder Bay National Marine Sanctuary and Underwater Preserve.

 The Flower Garden Banks National Marine Sanctuary (FGBNMS) has invested 5 years of effort to characterize the deepwater habitat both within the Sanctuary and the surrounding reefs and banks in the Northwestern Gulf of Mexico. A very small portion of the Flower Garden Banks is accessible with conventional scuba to depths of 133 ft (around 1.4% total), so submersible technology have been used to obtain data regarding the remaining 98.5% of the area within the Sanctuary. To date, the FGBNMS research team has conducted 112 ROV surveys within the Sanctuary, and 31 at nearby reefs and banks. Despite these accomplishments, there are limitations associated with submersible use - it is often challenging, if not impossible to conduct quantitative transects, accurate species identification, collection of fragile species, and collection of geological samples. Deeper scuba capabilities would provide access to reef systems that have never been visited by divers, representing approximately 27% of the area within the Sanctuary boundaries (to 230 ft depth). Access to high resolution multibeam data can provide accurate positioning for diver deployment, which also builds in a certain safety component to the diving operations. The area of interest to conduct deeper diving operations has been ground truthed by ROV which takes the element of the

unknown out of the operations. A system whereby ROV operations can coincide and assist with deeper diving operations has recently been utilized in Florida and proven to be highly successful. In addition to the area within the FGBNMS, McGrail Bank, located 98km east of the East Flower Garden Bank, is also a potential site for deeper diving capabilities. McGrail Bank harbors at least 0.15 square kilometers of coral reef that has never been explored by divers. It is currently unprotected from many threats such as anchoring, bottom fishing and long lining. It is critical that any management recommendations are backed by quantitative scientific studies. The FGBNMS research team have conducted ROV video surveys at this site, and have determined that this area supports coral reefs of up to 28% coverage, in depth ranges of 145 to 170 ft. This percent coverage number has a large error component associated with it because of the method by which it was obtained ROV with no way to measure the distance actually surveyed. The ability to place divers on the bottom at these depths would give the sanctuary team the critical capability to obtain quantitative data on these unprotected reefs. This data would provide managers with the necessary information to make informed decisions about health of the reefs. The scuba operations necessary to reach the objectives stated above require decompression equipment and techniques, and a hyperbaric chamber on site.

The Pacific Island Fisheries Science Center has utilized advanced/decompression diving over the past ten years to conduct research on monk seal foraging, black coral surveys, and most recently validation of hydroacoustic surveys. Of these items the black coral research is the most visible as it affects the main Hawaiian islands and the results are reported to the Fishery management council. Given the current loss of black coral stocks to infestation by the invasive octocoral Carijoa riesii, the situation is an important fishery issue that relies exclusively on decompression diving to get the data. Without the additional funding included in this request there will be a loss of the monitoring of the monk seal foraging archival array, discontinuation of the joint NMFS/ State of Hawaii annual black coral surveys, and shelving of current plans to validate hydroacoustic survey equipment.

The Center for Coastal Fisheries & Habitat Research, at Beaufort, NC, has been actively investigating the status of the invasive Indo-Pacific lionfish and the potential risk to the surrounding ecosystems of this invasion off the coast of North Carolina. The economic and environmental cost of invasive species continues to escalate and is currently cost billions of dollars in lost revenue annually. A recent invader to the Atlantic, the Indo-Pacific lionfish is of great concern to NOAA due to its venomous spines and the possible impacts to the native communities and fishery species in particular. Researchers have determined that the invasion is far more widespread than originally thought and therefore, it is imperative that this work continue. Specific tasks to be accomplished include: 1) continue to monitor the population abundance of lionfish and native fish communities to assess the risk to native communities 2) characterize the ecological role of lionfish to determine the risk associated with their presence, and 3) examine factors, such as bottom water temperature, that control the survival and spread of the lionfish in order to forecast

the potential extent of this threat. Unfortunately, conducting research in water depths greater than 115 ft, where lionfish are found, is logistically difficult due to the time and equipment constraints. Decompression dive operations allow scientists to safely extend their bottom times to accomplish their research objectives. Without this support the lionfish project will be in jeopardy and the research objectives will not be met.

The Thunder Bay National Marine Sanctuary and Underwater Preserve (TBNMS&UP) is experiencing an increase in popularity among recreational divers. Many deep shipwreck sites (those deeper than 130 feet) within the TBNMS&UP have been negatively impacted by concerted looting efforts and casual souvenir seekers. Moreover, due to their depth and the relatively recent official designation of the TBNMS&UP (2001), none of these sites have been archaeologically documented. The TBNMS&UP has a fundamental responsibility to use progressive research techniques to document, interpret and protect deepwater sites for the continued benefit of archaeologists, historians, recreational divers and the non-diving public. Many historic shipwrecks in the TBNMS&UP are located in water depths ranging from 100 - 300 feet. To safely and efficiently carry out documentation, decompression technology must be used. Such dives also require a hyperbaric chamber on site. TBNMS&UP staff would be severely handicapped if not able to conduct decompression diving, and in fact would not be able to fully carry out the sanctuary's mandate to preserve and protect all of the resources in Thunder Bay.

Contaminated water diving

The disaster associated with Hurricane Katrina in the gulf region of the United States presented a number of challenges for NOAA programs required to dive in these waters to help locate and identify obstructions in navigable waterways, rescue marine mammals, and generally help in the recovery effort. Because NOAA does not have the appropriate equipment, standards and procedures, and training to conduct dives in contaminated water NOAA divers were restricted from performing dives in the immediate area following the hurricane.

The great majority of the diving taking place by government agencies, including NOAA, and all levels of public safety dive personnel, is conducted with standard open-circuit scuba diving equipment. Traditional scuba equipment does not provide adequate protection for the diver who must operate in contaminated water. Wet suits are designed to permit water to enter the suit at the wrists, neck, and ankles to be warmed to body temperature and thus provide thermal protection. Any chemical or biological agents that can be absorbed through the skin presents an immediate hazard if a wet suit is worn.
The conventional scuba mask and regulator mouthpiece provide three additional points of entry for contaminants. If the regulator leaks (which they all do to some degree) or is dislodged from the diver’s mouth, the contaminant can be ingested. Even if the mouthpiece remains in place, the act of inhalation mixes the

water/contaminant with incoming air to create an aerosol that is breathed by the diver. Finally, if the mask leaks, contaminants can enter the human body through the membranes around the eyes and nose.

NOAA's involvement in contaminated water diving ended in the mid-1980's due to a lack of funding; therefore, the restorative effort ultimately hinges on the commitment of new funding for the program. Funding is needed in three areas: 1) Equipment RDT&E, 2) Standards and procedures development, and 3) Training of personnel, including both initial and on-going activities.

Ship husbandry diving

On January 10, 2007, the US Coast Guard released the report titled, Final action on the administrative investigation into the diving mishap and the resulting deaths of USCGC HEALY'S crewmembers that occurred on 17 August 2006.

The NOAA Diving Safety Board reviewed the report in detail on January 29, 2007. The goal in reviewing the report was to identify any issues that might lead to a similar occurrence within the NOAA Diving Program (NDP). Although the members of the Board felt that the risk of a similar incident in NOAA was minimal, the report identified several areas of vulnerability within the NDP.

A report titled, Review of the US COAST GUARD CUTTER HEALY diving incident report and recommendations to mitigate a similar occurrence in NOAA, was submitted to the Director, NOAA Commission Officer Corps and NOAA Office of Marine and Aviation Operations on February 26, 2007. The report identified 13 potential areas of vulnerability within the NDP (based on the HEALY report) and provided specific recommendations to address each issue. All recommendations were approved as submitted and funds provided for implementation by NMAO.

Although not directly tied to the HEALY incident, another related issue of vulnerability for NOAA is ship husbandry diving activities conducted from and under NOAA ships. Ship husbandry involves the care and maintenance of ships. Some examples of the underwater tasks involved in ship husbandry include: removing debris from propellers, cleaning intakes and hulls, inspecting and replacing zincs and anodes, and conducting inspections of hulls, rudders, shafts, and propellers for damage.

Currently NOAA divers perform these tasks using open-circuit scuba diving equipment. The problems in using this type of equipment for these tasks are:

Topside personnel cannot communicating with the divers,
Divers carry a limited amount of breathing gas on their backs, and
Divers are untethered (i.e., free-swimming)

Should a diver get fouled in any of the running gear (i.e., rudder, propeller, struts, driveshaft) or be injured by the sudden movement of the ship, the diver would have

to rely on their dive buddy to resolve the problem and communicate with surface personnel. However, this still does not address the limited amount of air available to the stricken diver or the concern over a diver being swept away by current.

The safest and most effective means of conducting this type of work is with surface-supplied diving equipment. With surface-supplied diving, the diver is provided an unlimited supply of air from the surface via an umbilical. The umbilical also contains a communications wire and a strength member which allows a two-way conversation between topside and the diver, and a means of retrieving the diver in heavy current or in an emergency. A video cable can also be added to the umbilical to send real-time video images from a diver-carried camera to the surface. This combination of voice communication and video is an excellent means of providing command personnel and engineers with data on the condition of the ship below the waterline.

Implementation of this capability requires funding to procure the equipment and for travel for NDC personnel to train NOAA divers in the use of the equipment

In summary, the above program adjustments will improve the health and safety of NOAA divers by reducing the response time to hyperbaric chambers, providing protection when diving in contaminated water, and enhancing NOAA's ability to safely support deeper and ship husbandry diving operations.

3. **Potential Alternatives:** (How else might this need be met? Are any other NOAA Programs / Line Offices or Government Agencies addressing this need?)

No other NOAA Program or Line Offices are currently addressing these needs/issues.

Non-material solutions (changes in doctrine, organization, training, leadership, personnel and / or facilities) which were considered include 1) do nothing, 2) curtail remote, deep, contaminated water, or ship husbandry diving activities, 3) contract diving to outside vendors, and 4) request assistance from other government agencies.

Alternative #1 would be to continue to operate as is. This alternative represents a neutral impact but would not improve the health and safety of NOAA divers.

Alternative #2 would be to discontinue all remote, deep, contaminated water, or ship husbandry diving activities. This alternative would have a significant negative impact on the accomplishment of NOAA research goals.

Alternative #3 would be to contract all remote, deep, contaminated water, or ship husbandry diving to outside vendors. Cost analysis of this alternative is substantially higher than performing the work in-house, and would remove the NOAA scientist from performing the work in-situ. Also, the average commercial

diver does not have the expertise necessary to conduct specialized scientific research.

Alternative #4 would be to request operational support for remote, deep, contaminated water, or ship husbandry diving to other government agencies. Only the US Navy and US Army have the capability of performing the tasks required and they have been used in the past to support similar efforts. Unfortunately, these agencies are only available sporadically and even then, may be called away at a moment's notice to support DOD requirements. Additionally, this alternative would remove the NOAA scientist from personnaly performing the work in-situ. Also, the average military diver does not have the expertise necessary to specialized scientific research. There would also be costs involved with logistics and travel for military personnel support NOAA efforts. Further, this alternative would not address the issue involved with conducting ship husbandry dives as the work may be required at a moment's notice while the ship is underway and it would not be feasible or timely to obtain support from someone not physically located on the ship.

4. **Base Activities Already in Existence:** (Describe current and planned financial commitments related to this program adjustment.)

The mission of the NOAA Diving Program (NDP) is to train, certify, and equip scientists, engineers and technicians to perform a variety of underwater tasks in support of NOAA's mission and to ensure that all diving operations are conducted safely, efficiently and economically.

Core products and services include: establish standards and implement procedures for conducting safe diving operations, train and certify scientists, engineers, and technicians in diving and medical-related subjects, provide safe, state-of-the-art, and well maintained dive equipment, provide guidance and expertise to the diving community, investigate and implement new diving technologies and techniques, foster cooperative working relationships with other diving programs, promote NOAA and the NOAA Dive Program through educational outreach, provide equipment, personnel and expertise to NOAA field operations, as needed.

The NDP is headquartered at the NOAA Diving Center (NDC) located at the NOAA Western Regional Center in Seattle, Washington. The NDC functions as the administrative support center and primary diver training facility for the NDP.

The NDC conducts a variety of training courses in Seattle and Key West. Each year the NDC conducts the following classes: Working Diver (3 ea), Divemaster (3 ea), Refresher (2 ea), Enriched Air Nitrox (3 ea), and Visual Cylinder Inspection (3 ea). During FY06, 150 individuals were trained and certified by the NDC in one or more of these specialties. An additional 32 Scientific Divers were certified in the field. Medical courses taught at the NDC included DAN Oxygen Administration, STCW Medical Person-in-Charge, and Diver Medical Technician. Ninety-nine (99) individuals completed these classes during FY '06.

The NDC also serves as the primary facility for dive equipment maintenance and distribution. All NOAA divers are issued dive equipment as part of a Standardized Equipment Program (SEP). During FY '06, the NDC outfitted 75 new and returning divers and performed annual maintenance on and re-issued over 800 regulators.

5. **Describe the Program Adjustment:** (In a paragraph or more suitable for the DOC budget submission, describe the program adjustment. Provide the cost estimate by 4-digit object class by fiscal year. Include the change in FTE / Other Personnel / NOAA Corps / Wage Mariners. For PAC items, ensure the ORF 'tail' is funded and addressed. What is the life-cycle cost associated with this program adjustment?)

This program adjustment includes: 1) the hiring of two FTE wage-grade employee to supervise diving and hyperbaric chamber operations, 2) purchase/construct one containerized hyperbaric chambers and two Emergency Evacuation Hyperbaric Stretchers, 3) purchase nine closed-circuit mixed-gas rebreathers and 22 sets of surface-supplied diving equipment, 4) conduct research, development, test & evaluation (RDT&E) of contaminated water diving equipment, rebreathers and other dive and medical equipment, 5) cover costs associated with overtime and shore leave for personnel support of remote and advanced diving operations, 6) provide logistical support for operations, and 7) complete NDC facility improvements. A summary of the FY09 FY14 program adjustment budget is as follows:

FY10: $964.1k + $1.27m
FY11: $964.1k + $547k
FY12: $964.1k + $458k
FY13: $964.1k + $342k
FY14: $964.1k + $635k

CATEGORY	FY10	FY11	FY12	FY13	FY14
Personnel	$126k	$41k	$44k	$47k	$129k
Supplies & Materials	$50k	$36k	$38k	$40k	$42k
Services & Contracts	$475k	$222k	$184k	$186k	$163k
Travel	$90k	$60k	$42k	$44k	$46k
Equipment	$529k	$188k	$150k	$25k	$25k
Totals	**$1.27m**	**$547k**	**$458k**	**$342k**	**$635k**

6. **Business Case:** (What is the return on investment? What is the cost avoidance / savings which will be realized?)

 If funding for this program adjustment is approved NOAA will be able to: 1) conduct 12 additional missions, totalling 240 research days per year that currently cannot be performed due to the lack of equipment and personnel to support the activities, 2) improve the quality and reduce the costs associated with emergency medical evacuations of NOAA personnel from remote locations, 3) conduct diving operations in contaminated water that currently cannot be performed due to the lack of appropriate equipment, standards and procedures, and training, 4) conduct deep diving operations more safely and efficiently using closed-circuit mixed-gas rebreathers, 5) conduct ship husbandry dives more safely and effectively, and 6) track dive information more accurately due to enhancements to the NDC diver database system.

7. **Impact if Denied:** (Explain the impact on the center or division, NMAO, NOAA Programs / Line Offices, etc. What is the level of Congressional interest?)

 If funding for this program adjustment is denied: 1) 12 research missions (240 research days) will not be accomplished, 2) the costs associated with any medical evacuations of NOAA personnel from remote locations will remain at its current high level, 3) divers will not have access to immediate medical care for diving-related injuries which will effect the efficacy of the medical treatment, 4) divers will continue to be restricted from diving in potentially contaminated water, 5) deep water research using divers will be limited to open-circuit scuba which is not as safe or efficient as using newer, state-of-the-art technology, 6) ship husbandry dives will continue to be performed using open-circuit scuba diving equipment which is not as safe or effective as the proposed alternative, 7) dive information will not be collected and used to determine long-term health effects of diving and efficacy of current diving standards and procedures for injury prevention, and 8) new equipment that might improve diver safety and efficiency will not be developed or tested, and thus, not made available to support NOAA research programs.

8. **Executability:** (What changes are required to the current staff and financial management system to handle this project? How does the project schedule interrelate with other projects in the Fleet Services portfolio? Does the project implementation make sense?)

 NDC has already constructed two (2) containerized hyperbaric treatment systems like the one described in this funding request. Should these program adjustments be funded, the additional chamber system can be constructed during the course of the year without any interruption of normal operations. The only interruptions of normal operations that may occur as a result of this program adjustment are: 1) time to conduct training for NOAA divers in new dive equipment and, 2) NDC facility

improvements. However, it is felt that normal operations will be able to continue with a few accommodations.

Constraints / Risks which could prevent this Program Adjustment from being executed as planned include None

9. **Cross-Line Office Potential:** (Identify the Line Office programs that will be supported by this program adjustment and describe how they will benefit.)

The following LO's and Units will be directly supported by the efforts outlined in this program adjustment:

Beaufort, NC (NOS)
Gray's Reef NMS (NOS)
Thunder Bay NMS (NOS)
Flower Gardens Bank NMS (NOS)
Navigation and Response Teams (NOS)
La Jolla, CA (NMFS)
Seattle, WA (NMFS)
PIFSC, HI (NMFS)
All NOAA ships operated by NMAO
All NOAA divers

10. **Partnerships with other agencies, Line Offices, or other entity? (**Identify and explain the partnerships, projects planned and benefits.)

The NOAA Diving Program regularly partners with the US Navy Diving Program for dive training and operational support. NOAA-assigned USPHS Officers routinely attend medical training courses offered by the US Navy at their training facility in Panama City, Fl. The US Navy has also provided personnel to serve as Diving Medical Officers (DMO) in support of advanced diving operations requiring immediate access to a hyperbaric chamber when NOAA/USPHS personnel were not available. NOAA standards and procedures for operation of hyperbaric treatment chambers requires a DMO on-site. Without the support of the USN, these operations could not have been conducted.

The US Army has also provided personnel to serve as chamber supervisor/operators for advanced diving operations requiring immediate access to a hyperbaric chamber when NOAA personnel were unavailable. NOAA standards and procedures for operation of hyperbaric treatment chambers requires a qualified chamber supervisor/operator on-site. Without the support of the US Army, these operations could not have been conducted.

The NDP also frequently collaborates with other research-oriented diving programs, including the NOAA Undersea Research Program and organizational members of the American Academy of Underwater Sciences (AAUS). The AAUS consists of over 100 educational and research instiutions throughout the United States.

11. **Users of Product:** (List all users of this proposed product to demonstrate economic and constituent benefits. How do they benefit?)

 NOAA employees
 NOAA contract employees
 Personnel employed by institutions that are members of the American Academy of Underwater Scientists (e.g., University of Hawaii, East Carolina UNiversity, etc.)
 NOAA National Undersea Research Program
 Volunteers
 Other federal, state, and local employees

12. **Performance Measures:** (How will this program adjustment affect the existing performance measures? Does this program adjustment require a new performance measure? Give specific numbers; e.g., estimated additional flight hours; impact on a $30M/year fishery industry; etc. Quantify how operations will be improved.)

 If funding for this program adjustment is approved: 1) evacuation time for an injured diver to a hyperbaric chamber in the worst case scenario (Northwestern Hawaiian Islands Monument) will be reduced from 36 hours to 30 minutes, 2) divers will be able to extend their depth capability from 225 fsw to 300 fsw, 3) divers will be able to safely conduct research in contaminated water conditions, 4) divers will be able to perform ship husbandry tasks more safely and effectively, and 5) seven additional research missions (88 research days) will be accomplished.

13. **Outsourcing and/or Contracting:** (Describe the nature of planned outsourcing / contracting required to support this program adjustment.)

 Contractors may be considered for supplying chamber hardware and support personnel in support of remote and/or deep diving operations. However, communication with NOAA's Office of General Counsel indicates a potential legal problem with contractors supervising federal employees. Year-1 start-up costs are estimated at $363.5k per year based on a quote from American Marine Corporation, Anchorage, AK for support of equipment and personnel. This quote is based on seven missions for a total of 88 days of operations. When based on 12 missions and 240 sea days, the cost escalates to $455.5k. Travel and per diem costs are not included in these figures.

 Contractor costs:
 Chamber (240 days x $155/day = $37.2k)
 Oxygen supplies (240 days x $55/day = $13.2k)
 Chamber supervisor/operator (240 days x $793/day = $190.3k)
 Travel rate is $45/hour/person (12 missions x 20 hrs/mission x $45 = $10.8k)
 Travel and per diem (12 missions x $2k/mission = $24k)
 Shipping (12 missions x $15k/mission = $180k)

The advantages of this option include no additional capital investment and the outsourcing of federal dollars to the private industry. The disadvantages include NOAA not having total control of resources, and additional administrative (purchasing, contracts & grants, etc.) actions be performed annually. The exact cost figure would depend on the location of the work and the number of days required and will be higher than the amount listed above.

Contract divers could be considered when contaminated water conditions are suspected. The downside of this alternative is that NOAA scientists are not directly involved in collecting the data in-situ, the delays involved with activating contract divers in response to developing HAZMAT situations, and the cost. The same disadvantages are applicable for conducting research in deep water using contract divers.

14. **Scalability of Program Adjustment:** (Can this change be incrementally funded across fiscal years? What alternative funding schedules could meet the need? What impact would these alternative approaches have?)

 Yes. This program adjustment spreads the costs over the entire five year period.

15. **New Authorization:** (Does this require new Congressional authorization? If not cite the current Congressional authorization.)

 None

16. **Priority Ranking by NMAO Center / NMAO Headquarters / Fleet Services Sub-Goal / NOAA Mission Goal / NOAA Line Offices:** (Considering all the program adjustments being advanced, where does this one fall in a priority list?)

 ????

17. **Previous Q&As and Budget Narratives:** (Provide a summary of the previous Q&As and budget narratives related to this program adjustment.)

 None

18. **Other:**

 None

IMPROVING NOAA'S DIVING SAFETY AND OPERATIONAL CAPABILITIES
PROGRAM ADJUSTMENT REQUEST`
FY10 – FY14

	Object Class	FY10	FY11	FY12	FY13	FY14
Personnel						
X Salaries	1112/3	$47k				$47k
X Benefits	1230	$14k				$14k
X Overtime & Dive Duty	1151/86	$16k	$17k	$18k	$19k	$36k
X Shoreleave	116X	$2k	3k	4k	5k	8k
X Regional Coordinator	1112	$20k	$21k	$22k	$23k	$24k
		$126k	**$41k**	**$44k**	**$47k**	**$129k**
Supplies & Materials						
X Field operations	2619	$25k	$26k	$27k	$28k	$29k
X NDC operations	2619	$25k	$10k	$11k	$12k	$13k
		$50k	**$36k**	**$38k**	**$40k**	**$42k**
Services & Contracts						
X Equipment RDT&E	2513	$150k	$150k	$125k	$125k	$100k
X Refurbish LP air compressor	2527	$10k	$10k			
X Construct compressor building – NDC	2527	$40k				
X Resurface floor – NDC	2527	$15k				
X Update equipment repair room	2527	$20k				
X Paint training tower	2527	$45k				
X Install heating in NDC bay	2527	$20k				
X DAN travel assistance	2619	$15k	$16k	$17k	$18k	$19k
X Convert HP compressor to electric	2527	$10k				
X Transportation & shipping	2213	$20k	$21k	$22k	$23k	$24k
X Install elevator	2527	$100k				
X Develop training manual & curricula	2510	$30k	25k	$20k	$20k	$20k
		$475k	**$222k**	**$184k**	**$186k**	**$163k**
Travel						
X Field support	2140/41 2142/43	$38k	$40k	$42k	$44k	$46k
X CWD workshop	above	$32k				
X Dive training (surface-supplied)	above	$20k	$20k			
		$90k	**$60k**	**$42k**	**$44k**	**$46k**

Document ID: 0.7.45.16512.1

Equipment						
X Containerized chamber system	2619/ 3121	$150k				$150k
X Emergency Hyperbaric Stretcher	3117	$80k		$80k		$80k
X Nitrox mixing system	3117	$20k				
X Mixed-gas rebreathers	3117	$20k	$20k	$20k		
X ½ ton pickup truck	3115	$22k				
X Surface supplied diving equipment	3111	$134k	$93k			
X Diver photo ID card system	3117	$8k				
X CWD equipment	3111	$75k	$75k	$50k	$25k	$25k
		$529k	**$188k**	**$150k**	**$25k**	**$255k**
Totals		**$1.27m**	**$547k**	**$458k**	**$342k**	**$635k**

IMPROVING NOAA'S DIVING SAFETY AND OPERATIONAL CAPABILITIES
PROGRAM ADJUSTMENT COSTS
FY10 – FY14
BUDGET EXPLANATION & JUSTIFICATION

PERSONNEL

X **Salary & Benefits:** Costs associated with hiring a WG-5201-9 Dive Equipment Worker to serve as dive/chamber supervisor in support of field operations. The adjustment includes one additional FTE in FY10 and another in FY14.

X **Overtime:** Costs associated with dive/chamber supervisor overtime when in travel status. Figures for FY10 – FY13 are based on 65 weeks of travel x 30 hrs/wk x $33.80/hr. FY14 figure is based on based on 91 weeks of travel x 30 hrs/wk x $33.80/hr.

X **Shore leave:** Benefits earned while being at-sea on NOAA ships. Figures for FY10 – FY13 are based on 192 hrs/year (12 days x 8hrs/day) x 3 individuals x $22.53/hr. FY14 figure is based on 288 hrs/year (12 days x 8 hrs/day) x 4 individuals x $22.53/hr.

X **Regional Coordinator:** Salary support for 0.25 FTE to serve as regional coordinator in Hawaii. Approximately 18% of all NOAA divers are located in the Pacific Island Region. An individual is needed to oversee and coordinate the myriad of administrative tasks associated with certifying, training, and tracking NOAA divers in the Pacific Island region – the fastest growing region for NOAA diving activities.

SUPPLIES & MATERIALS

X **Field Operations:** Costs associated with maintaining hyperbaric chambers and diving systems for remote or advanced diving operations.

X **NDC Operations:** Costs associated with creating additional storage space for new equipment included in this budget adjustment and for replumbing the NDC 80" diameter hyperbaric chamber.

SERVICES & CONTRACTS

X **Equipment RDT&E:** Costs associated with researching, developing, testing and evaluating new and existing equipment for potential use by NOAA divers. Examples of equipment to be developed and tested include: new contaminated water diving equipment, closed-circuit mixed-gas rebreathers, full-face masks, and oxygen delivery systems. The availability of new technology will improve the safety, efficiency, and operational capability of NOAA divers. Work will be accomplished via contracts to individuals and companies.

X **Refurbish LP air compressor:** The NDC has two low-pressure air compressors that need be overhauled. This adjustment includes funding for this work in FY10 and FY11. The work will be contracted to an outside vendor.

X **Construct compressor building:** If this adjustment is approved, additional office space for personnel will be needed. For this reason, and to reduce the noise level in the everyday working spaces occupied by personnel, the four air compressors will be relocated to a new

building to be constructed on the north side of building 8 of the NDC. Once removed, the space will be converted into office space. This work will be contracted to an outside vendor.

X **Resurface flooring at NDC:** The floor in the lower level at NDC is made of concrete. Over the years the floor has been painted to improve its appearance. Unfortunately, the paint has not held up very well to the wear and tear of moving heavy equipment and has had the opposite effect of improving its appearance due to the numerous worn and scraped spots. This adjustment includes funding to apply a commercial-grade coating to floor which should significantly improve its appearance to the numerous NOAA and other guests visiting the dive center. This work will be contracted to an outside vendor.

X **Update equipment repair room:** Costs associated with refurbishing the NDC equipment repair room. Enhancements include replacing the countertops, storage bins, and sink – all of which are over 20 years old and are the accumulation of various surplus items obtained when the NDC was originally constructed. This work will be contracted to an outside vendor.

X **Paint training tower:** The NDC training tower is 30-feet high, 15-feet in diameter and holds 40,000 gallons of fresh, filtered and chlorinated water. This adjustment includes funding for painting the entire facility (tower interior and exterior, platforms and stairs) in FY10. This work will be contracted to an outside vendor.

X **Install heating in NDC bay:** The interior open-bay area at the NDC is not heated space. Employees routinely work and pass through this area on a daily basis. Additionally, training is frequently conducted in this space. Occupying this space for any length of time during the winter months is uncomfortable and potentially unhealthy. Costs included in this adjustment are for the installation of heating (probably overhead gas heat) and will be contracted to an outside vendor.

X **DAN travel assistance:** Currently all NOAA units, with the exception of the NOAA ships, requiring air evacuation of injured divers must arrange for these services on their own. Many of these units do not know how or where to obtain these services, nor do they make any pre-arrangements for such services. Divers Alert Network (DAN), located in Durham, NC, provides an emergency evacuation service similar to that provided for NOAA ships and has agreed to provide this coverage to all NOAA divers. The cost of the membership is currently $29 per person per year. Based on a NOAA diving population of 500 divers, the cost of providing this coverage is $14,500 per year.

X **Convert NDC diesel compressor to electric:** In lieu of purchasing a new HP air compressor, the NDC will convert a 'like-new' surplus compressor from diesel-power to electric-power to replace the current NDC compressor that is over 15 years old. This conversion will save the government approximately $10k over the cost of replacement.

X **Transportation and shipping:** Costs associated with moving, loading and unloading hyperbaric chambers and dive equipment in support of field operations around the world.

X **Install elevator at NDC:** There are three offices (4 employees), a compressor room, and a classroom located on the second floor of the NDC. Currently there is no elevator available to assist handicapped personnel or to help move heavy objects to the second floor. There have been several occasions where physically handicapped individuals could not meet with NDC

personnel or participate in NDC activities in the classroom because no elevator was available. The elevator will be installed by an outside vendor.

X **Training manuals and curricula:** Costs associated with contracting the development of various training materials (e.g., manuals, curricula, training aids, etc.).

TRAVEL & PER DIEM

X **Field support:** Cost figures for FY10 – FY13 are based on 65 weeks of travel in support of 16 missions (six new and 10 existing. FY14 figure is based on based on 91 weeks of travel in support of 22 missions (six new and 16 existing).

X **Contaminated Water Diving Workshop:** Travel associated with convening a workshop of select government and non-government agencies to identify features and capabilities needed in new CWD equipment. Figure based on 10 agencies x 2 persons/agency x $1,564/trip.

X **Dive training:** Travel associated with training ship-based divers in the use of surface-supplied diving equipment and techniques. Costs figures are based on conducting training on the east coast and Gulf of Mexico in FY10 and on the west coast and Hawaii in FY11.

EQUIPMENT

X **Containerized chamber system:** The NDP currently has two eight by twenty foot containerized chamber systems. However, these systems are too large to fit on some of the smaller NOAA ships. The FY10 figure is based on costs to containerize a 42" diameter, double-lock recompression chamber (using existing chamber) and purchase the necessary ancillary equipment to support the chamber. When completed, by NDC personnel, this system will be able to fit on most NOAA ships.

X **Emergency Evacuation Hyperbaric Stretcher:** Costs to purchase one EEHS in FY10, FY12, and FY14

X **Nitrox mixing system:** Currently the NDC produces nitrox breathing mixtures for diving purposes using an antiquated and less accurate system. The system mixes oxygen and air based on pressures of each gas. A newer, more accurate system that separates oxygen from air and compresses it directly via an air compressor is available. As the headquarters for NOAA diving, the NDC should utilize the safest technology available for mixing nitrox. The system will be installed by an outside vendor.

X **Rebreathers:** Costs associated with purchasing three, commercial off-the-shelf, closed-circuit mixed-gas rebreathers (CCR) in FY10, FY11, and FY12. These units will be used for training and support of field operations where deep diving is involved. CCRs provide virtually unlimited gas supply to the diver regardless of depth and are lighter and use less gas than open-circuit scuba. This technology has been requested by scientists from the PIFSC and TBNMS&UP.

X **Truck:** Until FY06, the NDC leased a GSA-provided ¾ ton pickup truck to tow the Center's inflatable boat and haul dive gear during training classes. Due to the rising monthly cost of leasing the truck, plus the limited use it received, it was decided to discontinue the lease contract. With the additional personnel and equipment associated with this budget adjustment, some form of transportation will be required. In reviewing the options for lease

versus purchase, it has been determined that purchasing would be more cost-effective than leasing.

X **Surface-supplied diving equipment:** Costs associated with purchasing surface-supplied diving systems to support ship husbandry diving operations from NOAA ships. Thirteen systems, each consisting of a Super mask, safety harness, bailout bottle, 200-foot umbilical, 2-diver console with comms, side-block assembly, regulator, spares, and shipping/storage cases will be purchased in FY10 and an additional nine systems purchased in FY11. Ship-based divers will be trained in the use of the equipment either on-site or at the NDC.

X **Diver photo ID card system:** System for producing photo identification cards for NOAA divers. The current system is not capable of including a photo of the diver on the ID card. Inclusion of a photo on the NOAA diving certification identification card will prevent unauthorized use of the card should it be lost or stolen.

X **CWD equipment:** Cost to purchase 10 sets of newly developed CWD equipment for training and field use by NOAA divers.

Object Class	
11.1	Compenstation - Full-time permanent
1111	Commissioned officers
1112	General schedule
1112	General Merit
1112	Senior Executive Service
1112	Presidential Appointees
1113	Wage Schedule / Wage Board (Except Wage Marine)
1114	Wage Marine
1116	Subsistence and Quarters
1117	Variable Housing Allowance
1118	Actual Terminal Leave Payments
1119	Law Enforcement Pay
11.3	Compensation - Other than permanent full-time
1130	Full-Time Temporary (Except Wage Marine)
1131	Full-Time Temporary (Wage marine)
1132	Part-Time with Permanent Employment
1133	Part-Time Temporary (Except Wage Marine)
1134	Credit Hours earned or Comp. Leave Earned (Co-op Students)
1135	Intermittent Employment (Other)
1139	Other Employees Having Appointments Other than Full-Time Perm.
11.5	Other Personnel Compensation
1150	Availability Pay--Enforcement Agents
1151	Overtime (Includes Standby Pay)
1152	Night Work Differential
1154	Foreign Post Differentials
1155	Monthly Leave Supplement Payments
1156	Sunday Pay
1157	Holiday Pay
1158	Hazardous Duty Pay (All Personnel)
1159	Employee Cash Awards
11.6	Leave Surcharge Accounting Object Classes
1160	Leave Surcharge Full-Time Permanent
1161	Leave Surcharge Other Than Full-Time Permanent
11.8	Special personnel services payments
1180	Credit Hours Earned
1182	Compensatory Leave Earned
1184	Other
1185	Aviation Career Incentive Pay
1186	Special Pay for Diving Duty
1187	Special Pay for Sea Duty

Object Class	
12	Civilian personnel benefits
1210	Employer's Contribution Surcharge
1212	Uniform Allowances
1213	Cost of Living Allowance
1214	Real Estate Expenses
1215	Accident Compensation
1216	Miscellaneous Relocation Expenses
1217	Commuted Subsistence
1218	Other Personnel Benefits
1230	FICA
1231	Civil service retirement
1232	Health Benefits (FEHBA)
1233	Life Insurance (FEGLI)
1234	Medicare (CSRS Employees only)
1235	Relocation Income Tax Allowance (RITA)
1236	Federal Employee Retirement
1237	Federal insurance contributions- FICA (FERS)
1238	FERS Thirft Savings Plan Basic
1239	FERS Thrift savings plan Matching
1245	Royalties Paid to Current Employees
1251	Voluntary Separation Incentive Payments (VSIP) CSRS Buyout
1252	Voluntary Separation Incentive Payment (VSIP) Agency Contribution
1295	Relocation Services Program
13	Benefits for former personnel
1310	Retirement Benefits
1320	Severance Pay
1330	Unemployment Compensation for Former Personnel
1345	Other, Including Royalties to Former Employees
21	Travel and transportation of persons
2122	Rental or Charter of Airplane or Helicopters
2123	Rental of Passenger Carrying Vehicles (GSA vehicles)
2140	PER DIEM Expenses Related to Domestic Travel
2141	Commercial Car Rental Required for Domestic Travel
2142	Mileage Allowance for Use of Private Car While on Domestic Travel
2143	Common Carrier and Special Conveyance Transport (Domestic Travel)
2144	Other Expenses Associated with Domestic Travel
2146	Per Diem Expenses Related to Foreign Travel
2147	Commercial Car Rental and POV Mileage Expenses (Foreign Travel)
2148	Transportation and Other Expenses Related to Foreign Travel
2150	Gifts and Bequests Trqavel Reimbursements

X

Object Class	
22	Transportation of things
2211	Trans of household goods related to PCS Travel
2212	Mail Transportation
2213	All Other Transportation of Things
2214	GSA trucks
23	Rent, Communications, And Utilities
2318	Rental Payments to GSA Waived
2319	Rental payments to GSA
2320	Rental payments to others
23.3	Communications, utilities and miscellaneous charges
2330	Payment for Postage to the U.S. Postal Service and Foreign Gov't
2331	Utility services
2332	Aircraft charter
2333	Vessel charter
2334	Rental of office copying equipment
2335	Rental of ADP & Telecommuncations equipment (Leased)
2336	Telecommunications (Utility) Data/Network Services
2337	Federal telecommunications system
2338	Telecommunications (Utility) Local Services
2339	Telecommunications (Utility) Toll Calls
24	Printing and reproduction
2411	Publications
2414	Forms for internal use
2415	Other Printing not Otherwise Identified
25	Other Contractual Services
2501	MASC Data Processing Services
2502	MASC Publications Editing Services
2503	MASC Shop and Equipment Services
2505	ERL Program for Regional Observing and Forecasting Services
2506	ERL Pacific Marine Environmental Laboratory
2508	ERL WAVE Propagation Laboratory
2509	Retainment/Holdback of a portion of contractual payment charged to an object class in the 25XX series
25.1	Consulting services
2510	Information Technology/ADP Training
2511	Management and Professional Support Services (Other than 25.10)
2512	Studies, Analyses and Evaluation
2513	Engineering and Technical Services

Object Class	
25.2	Other services
2520	Aircraft repair
2521	Vessel repair
2522	Maintenance of equipment (Excluding 2523)
2523	Contracts for research
2524	Contract for Commercial Type Activities
2525	NOAA Weather Radio Operation and/or Maintenance Contract
2526	Other Training by University or Other Non-Federal Source
2527	Miscellaneous Contractual Services not otherwise classified
2528	Storage of Household Goods
25.3	Purchases of goods & services from Gov't accounts
2531	GSA Alterations and Repairs (under $200,000)
2532	Payments to Departmental WCF
2532	Payments to FA, WCF (CAMS)
2533	Office of Personnel Management Training
2534	ADP and Telecomm. Services (Other Agencies)
2535	All Other Services of Federal Agencies (Identify Agency)
2536	Fund Transfer between Financial Mgmt Centers for Services
25.5	Research and development contracts
2551	Research and development contracts(Non Federal)
2552	Research and development contracts (Federal)
26	Supplies and materials
2608	Retainment / Holdbacks of Portion Contractual charged to other 26XX series
2609	Undistributed Bankcard Costs
2610	GSA Customer Supply Center
2612	Purchase of Meteorological Upper Air Supplies
2613	Purchases - Maintenance of Vessels
2614	Purchase of Gases
2615	Purchase - Ships' Mess Supplies
2616	Purchases - Maintenance of Aircraft
2617	Fuel
2618	ADP supplies
2619	Purchases (All Others)
2620	ADP and Telecommunications Software
2621	Issues of 'Chart paper to printing plant
2622	Issue of Meteorological Upper Air Supplies
2623	Issue - Photographic Supplies
2624	Issues - Purchase of Laboratory Chemicals
2629	Inventory Issues (All Others)
2639	Adjustments to Inventories
2695	Warehouse Operations Surcharge

Object Class	
31	Equipment
3109	Retainment/Holdback of portion of contractual payment charged to 31XX
3110	Inventory - National Logistics Supply Center
3111	Office Furniture and Equipment - Capitalized
3112	ADP Equipment - Capitalized
3113	Aircraft - Capitalized
3114	Ships and Launches - Capitalized
3115	Motor Vehicles - Capitalized
3116	Telecommunications Equipment - Capitalized
3117	Other Capitalized Property
3118	Capitalized, Trade-Allowance (Depreciation)
3119	ADP and Telecommunications Software - Capitalized
3120	Non-Capitalized Equipment
3121	Non-Capitalized Equipment for Inventory
3122	Non-Capitalized Equipment issued from Inventory
3123	Non-Capitalized Purchase/Lease-to-Purchase ADP & Telecomm. Equip.
3131	Lease-to-Purchase ADP Equipment
3132	Lease-to-Purchase Telecommunications Equipment
32	Lands and structures
3209	Retainment/Holdback of portion of contractual pament in the 32XX series
3210	Land
3220	Building and Other Structures
3221	Capitalized, Leasehold Improvements
3230	Capital Leases of Buildings and Structures (Depreciable)
3231	Capital Leases of Land
33	Loans, Investments and Guarantees
41	Grants and Fixed Charges
4113	Coastal Zone Grants
4114	PL 99-659 (Title III) Grants
4115	PL 89-304 Grants
4116	PL 94-265 Grants
4119	Other Grants
4120	Taxes and Fees
4130	Subsidies
4140	Payments for Cooperative Agreements

Object Class	
42	Insurance claims and indemnities
4211	Claims and Indemnities
4212	Other Costs
4220	Other Claims and Indemnities Excluding Fishermen's Protective/Contigency
4241	Actual Costs Incurred by commercial fishermen for loss or damage
4242	Loss of profits incurred by commercial fishermen from time lost
4243	Iclude Costs of Exra Fuel Used, Investigatory Claims Efforts, etc.
43	Interest and Dividends
4301	Penalty payments for prompt payment act and state tariffs
4310	Prompt Payment Act Penalty
4311	Additional Prompt Payment Act Penalty Payments made through DOC
44	Refunds
50	Depreciation and Amortization
5010	Depreciation-Capitalized Equipment (Inventory)
5011	Depreciation of Office Furniture and Equipment
5012	Depreciation of ADP Equipment
5013	Depreciation of Aircraft
5014	Depreciation of Ships and Launches
5015	Depreciation of Motor Vehicles
5016	Depreciation of Telecommunications Equipment
5017	Depreciation of Other Capitalized Property
5019	Depreciation - Software
5020	Depreciation of Buildings and Structures
5021	Depreciation - Leasehold Improvements
60	Future Cost of Retirement Pay for Commissioned Officers
95	Collections for Quarters or Subsistence Furnished Employees

Year 1

Task	Cost
Convene a workshop of select government and non-government agencies to identify features and capabilities needed in new CWD equipment Delta P Fees 30 hrs x 4 wks x 4 mo x $85/hr = $40,800 Travel 2 trips x $2500 = 5,000 Speakers Travel 2/org x 10 org x $1564 = 31,280 Supplies 100	$77.2K
Develop design criteria and specifications for new CWD equipment based on workshop results Delta P Fees 15 hrs/wk x 4 wks x 6 mo x $85/hr = $30,600 Travel 3 trips x $2500 7,500	$38K
Seek proposals (RFP) for design concepts for new CWD equipment Delta P Fees 8 hrs/wk x 4 wks x 6 mo x $85 = $16,320	$16.4K
Total	**$131.6K**
NOTE: This does NOT include $30k for testing of AGA	

Year 2

Task	Cost
Award contract(s) for the design, manufacture, and testing of new CWD equipment, including: Conceptual designs Engineering drawings Serial lithography models Delta P Fees 30 hrs/wk x 4 wks x 12 mo x $85/hr = $122,400 Travel 6 trips x $2500 = 15,000	$1.9M $137.4K
Total	**$2.1M**
NOTE: $2500 for travel is averaged	

Year 3

Task	Cost
Complete contract(s) for the design, manufacture, and testing of new CWD equipment, including: Completion of drawings Creation of prototypes Unmanned testing of helmet Manned testing of suit	$1.96M

Manned testing of helmet TechEval of suit and helmet Delta P Fees 30 hrs/wk x 4 wks x 12 mo x $85/hr = $122,400 Travel 8 trips x $2500 = 20,000	$142.4K
Total	**$2.1M**

Year 4

Task	Cost
Develop standards and procedures for use of new CWD equipment and general diving in CWD Delta P Fees 15 hrs/wk x 4 wks x 6 mo x $85/hr = $30,600 Travel 1 trip x $2500 = 2,500	$33.1K
Develop training curricula for use of new CWD equipment and general diving in CWD and conduct training for NDC staff Delta P Fees 20 hrs/wk x 4 wks x 6 mo x $85/hr = $40,800 Travel 2 trip x $2500 = 5,000	$45.8K
Total	**$78.9K**

RESURRECTING
NOAA'S
CONTAMINATED WATER DIVING PROGRAM

RATIONAL AND NEED

The recent disaster associated with Hurricane Katrina in the gulf region of the United States has presented a number of challenges for those involved in the rescue and cleanup effort. Many areas were flooded, including 80% of the city of New Orleans. Floodwaters from six locations across the New Orleans area were sampled by the EPA and analyzed for chemicals and bacteria. Preliminary information indicates that bacteria counts for E. coli in the sampled areas greatly exceeded the EPA's recommended levels for contact. At these levels, human contact with water should be avoided as much as possible.[1]

Several NOAA Programs have indicated a need to dive in these waters to help locate and identify obstructions in navigable waterways, rescue marine mammals, and generally help in the recovery effort. This is not the first time this need has arisen. In the past, the NOAA Diving Center has been contacted by NOAA programs requesting advise and support for diving in potentially contaminated water. Unfortunately, NOAA divers do not have the appropriate equipment, standards and procedures, and training to conduct dives in contaminated water such as those resulting from Hurricane Katrina.

On September 1, 2005, the Director, NOAA Diving Program issued the following precaution to all NOAA divers:

> To all NOAA divers,
>
> It's been brought to my attention that some NOAA divers may be planning to conduct diving operations in water resulting from Hurricane Katrina. I would strongly advise against anyone diving in any standing water in these affected areas unless it can be positively determined that the water is not contaminated. NOAA issued dive equipment is not appropriate for diving in contaminated water and will not provide adequate protection from the various contaminates that are undoubtedly in these waters.
>
> Please do not risk your health, or that of your loved ones, by attempting to dive in these potentially contaminated waters.
>
> David A. Dinsmore,
> Director, NOAA Diving Program

DIVING IN CONTAMINATED WATER

During the last three decades, as the number of scientific diving operations in polluted water has increased, the spectrum of materials to which divers are exposed has grown as well. At first, little consideration was given to the possible effects of these materials on the divers themselves. In the early 1970s, for example, divers were used in studies that examined the fate and effect of sewage and chemicals introduced into the sea. Immunizations against certain pathogenic microorganisms, e.g., gamma globuliin, were given in some cases, but illness was still reported in some divers who were exposed to sewage. As the list of dangerous substances to which divers were being exposed increased and as the substances became more hazardous, attention was focused on the potential threat to diving and support personnel and on the effectiveness of available diving apparatus in protecting divers.[2]

Many divers are unaware of the dangers of diving in polluted water. While some bodies of water do not appear polluted, they may have high levels of biological or chemical contamination.[3, 4, 5, 6] Additionally, divers may mistakenly believe that the water itself will dilute the hazard to a low level while ignoring the possible cumulative effect of multiple exposures.

The same hazardous materials that would concern a person topside must concern divers under water. These hazards include biohazards, toxic chemicals, and radiation. However, the situations in which divers encounter these underwater hazards are very different from those on the surface. The main difference in dealing with a hazardous material under water is that, in most cases, the hazardous material is suspended or dissolved in the water around the diver. This means that unless the diver equips himself properly, the material may enter the diver's mouth through the regulator or mask. For this reason, ordinary scuba equipment is not considered acceptable for this type of diving. Contaminants may also get into a diver's eyes, even if he wears a full-face mask or helmet, and they can touch his skin through his wet suit. Compare this situation to a liquid spill topside, where the chemical puddles in the street, and it's easy to appreciate the increased risks. In addition, some materials that present only a minor concern on the surface create a major exposure hazard under water. This is why even full coverage diving helmets must be specially rigged for dives of this nature.

Toxins that float on top of the water, such as gasoline and oil, also present a serious hazard to the diver. The diver must pass through them to enter or exit the water. Substances that sink in water are those most likely to collect as pockets of pure chemical substance on the bottom. Concentrated chemicals are obviously very hazardous.

Aside from the risks of exposure to hazardous materials, divers may also be exposed to thermal hazards (hyperthermia) associated with using conventional exposure suits and masks/helmets. These hazards, which are similar to those faced by hazardous-material ("HAZ-MAT") personnel topside, include fluid loss, heat cramps, and heat exhaustion. From the time that the diver dresses-in before the dive until completion of

decontamination at the end of the dive, heat stress can be a severe problem. If the diver works in cold water, some of the heat stress will be relieved during the dive. Moving from very warm surface climates into cold water, and back to hot surface temperatures, is also stressful. If the diver works in warm water, there is no relief from heat stress. Overheating may be a very real danger. Divers who work in warm waters must carefully evaluate these conditions and plan dives accordingly.

EQUIPMENT

Contaminated water diving (CWD) operations require specialized equipment. Both the divers in the water and the support personnel topside must be properly equipped. Although equipment used topside is essentially the same as that used by personnel for HAZ-MAT operations, special consideration must be given to splash-back protection and the amount of water required to decontaminate the divers.

Equipment used for CWD is somewhat different from standard "off the shelf" scuba or surface-supplied diving equipment. There are several characteristics of commonly used diving equipment that make it unacceptable for diving in contaminated water: foam neoprene dry suits are difficult to impossible to adequately decontaminate; the numerous "breakable" seals on masks, helmets, and suits increase potential for leaks; and reliable, dry-glove arrangements are scarce. Moreover, exhaust valves in standard scuba demand regulators allow a few small droplets of water to enter during the exhaust cycle. When the demand valve is activated during inhalation, the jet of incoming air breaks up the droplets into an aerosol which is then inhaled by the diver.

Just as there are different levels of protection for HAZMAT situations topside, there are different types of diving equipment needed according to the hazard level under water. Unfortunately, no standards currently exist for diving equipment that can be selected based upon the potential effects/risks of the hazard to the divers. After evaluating actual and potential contaminants in the dive planning process, three options are available:

1. For severely contaminated environments where exposure to the elements might be fatal to a diver, diving is not an option. In this case, other means (i.e., remotely operated vehicles, surface sampling devices, etc.) must be used.
2. For less severe but still hazardous exposures where exposure could permanently disable a diver, total encapsulation (i.e., full-coverage helmet mated to a dry suit with dry gloves) is required.
3. For minimally contaminated environments (i.e., where contaminants are bound to sediments or the waters carry low levels of biological contamination) where exposure could minimally affect (i.e., temporary sickness) a diver, a full-face mask has traditionally been used with a dry suit and dry gloves. This system offers a lesser degree of protection than a helmet but more protection than a half mask with scuba regulator.

A number of government agencies (US Navy, National Parks Service, FBI) and civilian commercial diving companies have the equipment required to totally encapsulate divers

for diving in contaminated water. Such systems involve the use of surface-supplied equipment; whereby the diver's breathing gas is supplied via a hose from the surface. Advantages of this type of system are unlimited gas supply and clear voice communication. The disadvantages include limited vertical and horizontal mobility (distance that a diver can traveled due to the umbilical), slow deployment, weight, and cost.

The great majority of the diving taking place by government agencies, including NOAA, and all levels of public safety dive personnel, is conducted with standard scuba. Traditional scuba equipment does not provide adequate protection for the diver who must operate in contaminated water. Wet suits are designed to permit water to enter the suit at the wrists, neck, and ankles to be warmed to body temperature and thus provide thermal protection. Any chemical or biological agent that can be absorbed through the skin presents an immediate hazard if a wet suit is worn.

The conventional scuba mask and regulator mouthpiece provide three additional points of entry for contaminants. If the regulator leaks (which they all do to some degree) or is dislodged from the diver's mouth, the contaminant can be ingested. Even if the mouthpiece remains in place, the act of inhalation will mix the water/contaminant with the incoming air and create an aerosol that will result in the diver inhaling the contaminant. Finally, if the mask leaks, exposure to eyes can allow contaminants to enter the human body through the membranes around the eyes and nose. At the very least contaminants may cause burning and ultimately blindness. While the need is for a self-contained capability, the goal is the same as with surface-supplied CWD total isolation of the diver from the surrounding water.

As an example of the potential hazard, in a major East Coast metropolitan city, fire fighters are trained to dive under the city docks and piers to combat wharf fires. This same city dumps more than 200 million gallons of raw sewage into its rivers on a daily basis. Recently the fire department conducted diver training within 200 yards of a sewer outfall. The divers wore standard wet suits and used conventional scuba equipment. Over the course of three months, 17 out of 40 divers developed gastrointestinal symptoms (stomach flu, diarrhea, cramps, nausea, etc.) following training dives. The majority of the symptoms were attributed to the protozoans in the water. Medical literature suggests that swallowing 10 or fewer of these animals, in the equivalent of a few drops of water, is sufficient to cause illness.[2]

Even the use of full-face masks, vulcanized rubber drysuits and dry gloves may not provide adequate protection. According to Dr. Paul Weathersby, consultant to the US Navy on CWD, currently available full-face masks may not be suitable for diving in even minimally contaminated water due the mask's inability to prevent egress of water.[4]

NOAA HISTORY IN CONTAMINATED WATER DIVING

NOAA personnel, particularly divers, are exposed to some degree of water pollution during the performance of their official duties. Of particular concern was the pollution from bacterial and viral pathogens as a result of sewage disposal practices. Initiated and funded by the Environmental Protection Agency (EPA), polluted water equipment studies were conducted by NOAA and EPA personnel at the NDHTC in Miami in the late 1970's. Additional participants included the University of Maryland, the Naval Medical Research Institute, the Naval Coastal Systems Center, the U.S. Coast Guard, and the Veterans Administration. The studies resulted in the design of specialized equipment and procedures to protect divers operating in polluted waters.[5]

The equipment and procedures resulting from these studies provided the technology for diving in biologically contaminated water with surface-supplied equipment. Unfortunately, these RDT&E efforts stopped by the mid 1980's due to the lack of funding. Without continued support for equipment testing, procedure development, and training, NOAA's CWD program quickly ceased to exist. Currently, the NOAA Diving Program does not have the equipment, procedures, or personnel to conduct diving in contaminated water.

SHORTFALLS TO MEETING NOAA PROGRAM REQUIREMENTS

NOAA's involvement in CWD ended in the mid-1980's due to a lack of funding; therefore, the restorative effort ultimately hinges on the commitment of new funding for the program.

Funding is needed in three areas: 1) Equipment RDT&E, 2) Standards and procedures development by an outside consultant, and 3) Training of personnel, including both initial and on-going activities.

Equipment RDT&E

Laboratory tests needs to be conducted on the effectiveness of commercial-off-the-shelf (COTS) full-face masks for preventing the egress of water. Many government and civilian agencies, including NOAA, are operating under the premise that a full-face mask, worn over a vulcanized rubber drysuit, along with dry (water-tight) gloves, provides adequate protection for CWD. Anecdotal information suggests that this may not be accurate. Tests need to be conduct to prove or disprove this conjecture.

New diver-worn equipment needs to be developed specifically for use by free-swimming scuba divers in minimally contaminated water. Full-face masks need to be developed for either tethered or scuba operations that completely prevents the egress of water. New exposure suits need to be developed that are lightweight and flexible providing the diver with a full range of motion in a free-swimming mode. Of course any new equipment will have to be resistant to various biological and chemical contaminants and either be disposable, or easily decontaminated.

NOAA does not have the personnel or expertise to design, construct and test new equipment for CWD and therefore, will need to contract this work to an outside vendor.

Standards and Procedures Development

Currently there are no standards and procedures for diving in contaminated water. These will need to be developed before divers can begin using a new equipment that's developed. Examples include:

- Minimum equipment requirements
- Minimum personnel requirements
- Maximum contaminates permitted
- Minimum qualifications for diving
- Decontamination procedures
- Emergency procedures

NOAA does not have the personnel or expertise to develop these standards and procedures and therefore, will need to contract this work to an outside vendor.

Training

Training for CWD operations requires the combined talents of many people. Ideally, the staff for a training course in CWD would include a biologist, a chemist, a HAZ-MAT specialist, and a diving safety officer familiar with appropriate diving equipment and procedures.

As a minimum, CWD training should include the following topics along with hands-on and in-water scenarios:

- Hazard recognition and evaluation
- Go/No-Go decision making
- Equipment selection
- Dive planning
- Dress-in procedures
- Diving procedures
- Emergency procedures
- Post-dive decontamination

Both divers and topside personnel need training specific to their involvement in an operation. Training needs to cover not only the "how," but also the "why" of this type of diving. Because CWD is unique, and hopefully needed on an infrequent basis, regularly scheduled refresher training will be vitally important to maintain proficiency.

As with the development of equipment and standards/procedures, NOAA does not have the personnel or expertise to initially conduct this training and therefore, will need to contract this work to an outside vendor. However, once NDC staff are trained, they should be able to conduct training in this area.

FUNDING PLAN TO MEET SHORTFALL

A 4-year plan is proposed to meet the shortfalls identified in the previous section. The total cost to resurrect and update NOAA's contaminated water diving program is $4.352 million.

Year 1

Task	Cost
Convene a workshop of select government and non-government agencies to identify features and capabilities needed in new CWD equipment	$66.2K
Develop design criteria and specifications for new CWD equipment based on workshop results	$27.6K
Seek proposals (RFP) for design concepts for new CWD equipment	$14.8K
Total	**$108.6K**

Year 2

Task	Cost
Award contract(s) for the design, manufacture, and testing of new CWD equipment	$2.1M
Total	**$2.1M**

Year 3

Task	Cost
Complete contract(s) for the design, manufacture, and testing of new CWD equipment	$2.1M
Total	**$2.1M**

Year 4

Task	Cost
Develop standards and procedures for use of new CWD equipment and general diving in CWD	$27.6K
Develop training curricula for use of new CWD equipment and general diving in CWD and conduct training for NDC staff	$15.8K
Total	**$43.4K**

CONCLUSION

From the late 1970's to mid 1980's, NOAA was the leading federal authority in the United States on contaminated water diving. Funding cuts promptly ended all work in this area and currently NOAA divers are not authorized to conduct dives in contaminated water due to the lack of appropriate equipment, standards and procedures, and training. The recent disaster associated with Hurricane Katrina has

highlighted the need for NOAA divers to be able to dive in these waters. It is in the interest of NOAA to resurrect its contaminated water diving program in order to help NOAA meet its research objectives and help promulgate this needed technology to others throughout the world. To do this, improvements must be made to the technology that NOAA helped develop over twenty years ago. The main focus of this effort will be to develop a system that will permit personnel to carry out their tasks in the safest, most efficient, and most expeditious fashion possible using scuba.

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[6]Weiss, E. 1982. 'The *Legionella* group of bacteria in the environment and in human disease', Marine Technology Society Journal, 41-46.

[7]Personal conversation with Dr. Paul Weathersby, 2004.

[8]Wells, J.M. 1984. Equipment innovations cut risks for divers in polluted waters. Sea Technology Magazine, December, 1984.

Received(Date): Thu, 06 May 2010 11:26:14 -0400
From: John.Ewald@noaa.gov
Subject: NOS recap of oil spill response
To: Oil.Spill@noaa.gov

All,

Best recap I've seen so far of NOS' efforts in Deepwater Horizon. Came from our weekly report submission. FYI.

· Improving weather allowed NOAA's Office of Response and Restoration (OR&R) to resume overflights and dispersant operations on May 5, when four aircraft applied dispersants to the surface slick. Dispersant application by vessels was expected to begin May 6. Monitoring of dispersant efforts is ongoing; overflights were conducted over the source and also from Mobile, Alabama, to the south.
· Technical specialists and other personnel from many agencies and organizations are assisting OR&R in providing scientific support for the spill response, e.g., the National Atmospheric Release Advisory Center (NARAC), an atmospheric hazards prediction team at Lawrence Livermore National Laboratory, was to begin predictive modeling of smoke plumes from in-situ burning planned for May 6; NASA offered NOAA a reconnaissance aircraft for overflights of the affected areas, during which trained observers record the location of the oil, affected wildlife, and other relevant observations).
(Contact Doug.Helton@noaa.gov, OR&R, 206-526-4563.)
· To support safe and efficient maritime commerce, NOAA's Office of Coast Survey (OCS) is producing nautical charting products that display the spill zone forecast based on the most recent projections. The charts depict the 48-hour forecast for oil location juxtaposed against the standard safety fairways that lead to port approaches.
· Vessels that pass through oil must undergo decontamination before entering ports. OCS's electronic and raster charts are being updated daily to assist mariners, and the U.S. Coast Guard is using the information to craft instructions to vessels transiting U.S. waters.
· OCS is also coordinating with the United Kingdom (UK) Hydrographic Office to provide spill forecast data for the UK charting system that many foreign vessels use when navigating into U.S. ports.
(Contact Doug.Baird@noaa.gov, OCS, 301-713-2724 x101.)
· NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) operates and maintains an extensive network of measurement systems that include water level, meteorological, and near-shore current meters throughout the Gulf of Mexico. To support the spill response effort, existing products were modified to display real-time data and predictions, e.g., NOAA Storm QuickLook, a hurricane-based product, was reengineered to include a NOAA spill graphic and now provides a detailed view of water levels and meteorological data in potentially affected areas.
· CO-OPS developed a specialized display of Physical Oceanographic Real-Time System (PORTS) data from its Gulfport, Pascagoula, and Mobile Bay PORTS. MyPORTS, a customizable PORTS application, was used to create a display of the speed and direction of currents, as well as weather observations, in the spill area.
· CO-OPS and the Office of Coast Survey Development Laboratory are developing a high-resolution hydrodynamic model of the northern Gulf Coast from the Rio Grande River in Texas to Pensacola, Florida, which will produce 48-hour forecasts of water levels and currents.
(Contact Richard.Edwing@noaa.gov, CO-OPS, 301-713-2981 x123.)
· NOAA's National Geodetic Survey (NGS) deployed a flight crew and sensor operators to provide aerial imagery support for the spill. The imagery is being collected from NOAA's latest addition to its air fleet, a Beechcraft King Air 350, which is outfitted with state-of-the-art mapping sensors. Data acquisition will focus on the land/water interface in high-priority areas in an effort to protect wildlife and the shoreline.
· NGS also provided remotely sensed imagery from previous mapping projects to help response personnel assess shoreline features that were present prior to the spill.
(Contact Eric.W.Berkowitz@noaa.gov, NGS, 301-713-2663.)
· NOAA's Office of Ocean and Coastal Resource Management (OCRM) is helping the five Gulf Reserves detect and prepare for the oil's potential landfall. Efforts include matching existing expertise (e.g., Hazmat certification) with specific needs at affected reserves. Effects of the oil in estuaries, where many species of marine life breed, could be especially damaging. Reserves in Mississippi, Alabama, Florida, and Texas have been collecting water and sediment samples to establish a baseline measure for hydrocarbon and other contaminants before oil reaches the bays and wetlands. Reserve staff are being trained to handle

hazardous materials so that they can help with cleanup and continue sampling efforts.
· The Marine Protected Areas (MPA) Center created a map entitled "U.S. MPAs in Proximity of the Deepwater Horizon Oil Spill," showing the boundaries of MPAs that could be affected by the oil, in addition to other data (e.g., management agency, conservation focus, size).
· NOAA Coastal Zone Management specialists are in regular contact with state coastal managers across the Gulf region, providing NOAA and federal updates and relevant contacts in the event that the oil reaches the states' coastal waters and shores.

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Received(Date): Fri, 07 May 2010 09:04:56 -0500
From: "Perry A. Thompson" <Perry.A.Thompson@noaa.gov>
Subject: Re: Fw: Acoustic Detection of Oil
To: Lisa Desfosse <Lisa.Desfosse@noaa.gov>
Cc: Charles.H.Thompson@noaa.gov
Perry_A_Thompson.vcf

Lisa,

The Port ET told me that the Gunter EK60 has 18kHz, 38kHz, 120kHz and a 200kHz transducer. They are operational but possible needs calibration. Apparently there is a little background scatter showing up on the outer edge of the beams.

Perry

Lisa Desfosse wrote:
> Thanks Charles - I have sent this up the chain. If they need your
> help I will let you know.
> Perry - Can you check with the Gunter and make sure everything is
> operational just in case.
>
> Lisa
>
> Charles.H.Thompson@noaa.gov wrote:
>> Lisa,
>>
>> Gunter has a Simrad EK60 system with 38kHz and 120kHz frequencies. The
>> 38kHz transducer was replaced in the dry-dock this winter. I assume it's
>> operable but I don't know for certain.
>>
>> If needed, I can coach someone who'll be on the cruise to set up the
>> system and record some data.
>>
>> Charles
>>
>> ----- Original Message -----
>> From: Perry.A.Thompson@noaa.gov
>> Date: Thursday, May 6, 2010 7:59 pm
>> Subject: Fw: Acoustic Detection of Oil
>>
>>
>>> Charles,
>>> Can you give Lisa a answer?
>>> Perry
>>> Sent from my Verizon Wireless BlackBerry
>>>
>>> -----Original Message-----
>>> From: Lisa Desfosse <Lisa.Desfosse@noaa.gov>
>>> Date: Thu, 06 May 2010 18:45:18 To:
>>> 'Perry.A.Thompson@noaa.gov'<Perry.A.Thompson@noaa.gov>
>>> Subject: Fw: Acoustic Detection of Oil
>>>
>>> Perry - can you respond to this.
>>>
>>> Lisa
>>>
>>> _____

>>> From: Steve Murawski <Steve.Murawski@noaa.gov>
>>> To: Philip M Kenul <Philip.M.Kenul@noaa.gov>; Lisa Desfosse
>>> <Lisa.Desfosse@noaa.gov>; Craig Mclean <Craig.Mclean@noaa.gov>;
>>> Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>; Nancy Thompson
>>> <Nancy.Thompson@noaa.gov>Sent: Thu May 06 16:03:55 2010
>>> Subject: Acoustic Detection of Oil
>>>
>>> Please see below. Ona thinks we can see the oil body at 18 and 38
>>> khz and perhaps back scattered at higher frequencies. I can run
>>> this down if we need to
>>>
>>> Lisa, what do we have on the Gunter for sonars? I am thinking that
>>> we might be able to take a swing south of the spill to see of we can
>>> see oil on the machine as we do the cruise for ichthyo.
>>>
>>> thoughts?
>>>
>>> tx
>>>
>>> -Steve
>>>
>>> -------- Original Message --------
>>> Subject: FW: Deepwater Horizon Oil Spill
>>> Date: Tue, 04 May 2010 15:51:02 +0200
>>> From: Olsen, Erik <erik.olsen@imr.no><mailto:erik.olsen@imr.no>
>>> To: Steve murawski
>>> <Steve.Murawski@noaa.gov><mailto:Steve.Murawski@noaa.gov>CC:
>>> Misund, Ole Arve
>>> <ole.arve.misund@imr.no><mailto:ole.arve.misund@imr.no>, Ona, Egil
>>> <egil.ona@imr.no><mailto:egil.ona@imr.no>, Godoe Olav Rune
>>> <olav.rune.godoe@imr.no><mailto:olav.rune.godoe@imr.no>, Johnsen
>>> Espen <espen.johnsen@imr.no><mailto:espen.johnsen@imr.no>, Klungsøyr
>>> Jarle <jarle.klungsoeyr@imr.no><mailto:jarle.klungsoeyr@imr.no>
>>>
>>> Dear Steve,
>>>
>>> Here is some further considerations regarding the detection of oil
>>> using acoustics. Hope this is of help
>>>
>>> Best Regards
>>>
>>> Erik Olsen
>>>
>>> From: Ona, Egil
>>> Sent: 4. mai 2010 15:49
>>> To: Olsen, Erik
>>> Subject: RE: Deepwater Horizon Oil Spill
>>>
>>> Dear Erik,
>>>
>>> I was directly involved in the computations on acoustic scattering
>>> from the experimental oil spills in 1995, North Sea, and further in
>>> the planning of the 2000 release.
>>>
>>> I have found the computations made, showing that the backscattering
>>> is quite good, using the specific density 0. 867 as for the North
>>> Sea oil, and depending on resolved droplet size, using a diameter of
>>> 2 mm we expected about -36 dB/litre, or similar or a bit stronger

>>> than euphausiids. On the first experiment we used 120 kHz, Simrad
>>> EK500, but failed due to computer problems. However, nice cross
>>> sections of the plume was made with a Mesotech scanning sonar from
>>> an ROV at different positions outside the plume. Also, the plume was
>>> registered on a standard fishery sonar from one of the participating
>>> vessels.
>>>
>>> Later, the deep, 800 m plume was clearly detected and measured with
>>> the Simrad Ek500 at 38 kHz, and we are now looking for the raw data
>>> also to see if it was detected at the 18 kHz system.
>>> From a research vessel with good signal to noise SNR, conditions,
>>> you will probably see the plume to 800-1000 m at the 38 kHz system,
>>> and maybe further on the 18 kHz system. Closer to the surface, the
>>> plume can be detected at all frequencies, probably with a clear
>>> frequency response, with higher backscattering at 70, 120 and 200
>>> kHz systems.
>>>
>>> Best wishes,
>>>
>>>
>>> Egil Ona
>>> Principal Scientist, Fisheries Acoustics
>>> Adjunct Professor, University of Bergen
>>> Institute of Marine Research
>>> Bergen
>>> Norway
>>> Phone: +47 55238455
>>> FAX: +47 55238531
>>> WEB: www.imr.no<http://www.imr.no>
>>>
>>>
>>>
>>>

Perry A. Thompson

SEFSC Vessel Coordinator

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228/769-9200 (Fax)
228/219-1319 (Cell)

Perry.A.Thompson@noaa.gov (Internet)

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Perry A. Thompson

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First:	Perry A.
Middle:	
Prefix:	
Suffix:	

Organization
Mississippi Laboratories
NOAA/NMFS

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Locality:	Pascagoula
Region:	MS
Postal Code:	39567
Country:	U.S.

Electronic Mail Address (Internet)
Perry.A.Thompson@noaa.gov

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228/769-9200

Telephone Number (Cell)
228/219-1319

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FALSE

Version
2.1

Received(Date): Sat, 08 May 2010 14:42:41 -0400
From: Rachel.Wilhelm@noaa.gov
Subject: Interview Transcripts
To: Oil Spill <Oil.Spill@noaa.gov>
Cc: Beth Dieveney <Beth.Dieveney@noaa.gov>,Michael Jarvis <Michael.Jarvis@noaa.gov>
Naples_050710.doc
WSJ_050610.doc
AFP_050610.doc
MiamiHerald_050610.doc
Reuters_050710.doc
Houma_050710.doc

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5/7 Eric Staat, Naples Daily
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Eric Staat, Naples Daily **May 7, 2010**

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What does NOAA plan to do to get a handle on subsurface oil?
We're trying to understand where this subsurface oil is.
- Couple issues to think about. Oil released from sea floor. From the floor to the surface, physical processes that we have some understanding of but not complete understanding because we've never dealt with a spill from the sea floor of this magnitude. More often from rigs or tankers on the surface.
- Lots of people trying to figure out how to evaluate this
- Because this rig wasn't producing oil, we don't have great understanding of its composition. It's pretty hard to get a sample of the sea floor but we're trying.
- We think it will behave similar to other blocks around there, but every oil is different and even varies from extraction to the end of the field – oil composition changes
- Looking at some other block oils around there and trying to make some inferences about how this oil might behave.
- Fairly large percentage of this should evaporate, but 10% should disperse within the water column, even without dispersants.
- Have evaporation, floating and dispersal. Then add in dispersants by ships and aircraft and the test to see if dispersants could be applied at the sea floor.
=- Lots of challenges here to understand the fate of the oil on its own and how does it change with the response technologies that have been applied and proposed.

- Sea floor dispersants; tests were done. WE proved we could do it operationally but I believe there's a hold on further testing until we evaluate what we think the fate of the oil might be from the application at that depth.

When applying dispersants at surface, tiny globules that sink?
- Breaks it into tinier pieces – can do the test in a glass jar with some vegetable oil and laundry detergent. Will go from globules to pea-sized droplets. Not getting rid of the oil but breaking it into smaller pieces that are more rapidly degraded by natural processes.
- Tradeoff is allowing natural processes to accelerate because of surface area.
- Where pre-approved for use is usually deep water. Don't generally apply dispersants in shallower areas close to benthic communities.
- Mathematical solution – taking 2 dimensional problem – oil on water surface and now spreading it over 5-10 meter water column that served to loosen it; more surface area to work on.

- We have good idea of how dispersants work at sea surface but trying to understand how they work at greater depths.

How is NOAA mapping subsurface spill?
- Surface mapping is partly observation and partly modeling, satellite imagery. We don't have satellite imagery equivalent of dispersal
- Some samples collected in water column, then models of fluid dynamic models. Mixing one liquid into another. Can measure liquids at point, but need models to understand combined liquid

- Not sure when modeling will be complete. Getting updates but my group focuses on surface modeling.

Hurricane hunter planes?
- Surface drift buoys at sea to see how they're drifting feeds into our surface models.

Some efforts to collect samples at depth, some oceanographic instruments on rig digging relief wells. Some instrumentation on there to get a better understanding of currents there.

Loop Current well south of oil. We don't see it in our time frame

Every response effort is a tradeoff – no magic bullet. Always trying to figure out

Jeff Ball, Wall Street Journal **May 6, 2010**

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What's the latest on trajectory – LA mid-week then move north?
- Still general flow toward north and west – Alabama (north), Mississippi (north), Louisiana (west)
- Will continue on current trajectory. Don't see a big move toward south or east.
- In 72-hours, we don't see it move towards Florida but toward north and west. LA closest land

West of Mississippi River?
- River draining a lot of water, convergence between river and ocean water.
- Currents colliding. For things that float like oil, they caught in convergence line.
- Like crossing a busy road – not easy to cross – once in the road, easier to get carried across it.
- We're looking at the plume of Mississippi and not seeing plume moving across it.

It will hit in the next 72 hrs; has it made landfall?
- Predictions of landfall are red on map – Chandeleur islands, SW Pass Those are predictions.
- So far, oil has been in those areas.
- Some oil in Chandeleur Islands but not huge amount. Teams started to see that – not sure when.
- We've been saying unconfirmed reports because overflights delayed by weather.
- Believe boat crews were out yesterday and it was reported – news cameras there.

How do you make computer models? People confused.
- Trajectories have been pretty accurate.
- Satellite images next day from NASA confirm – oil been staying in same area.
- We were pushed to make longer projections beyond 72 hours but we stayed with it because of the uncertainties after that. Satellite image for today is pretty close to our forecast.
- Even if you get tarball in uncertainty area, we modeled 99.9% of oil correctly. Possible to have scattered tarballs on someone's shoreline but that doesn't mean the model is wrong.
- If we haven't had overflight observations in 3-4 days because of weather, we may have bigger uncertainty bounds.
- We have a team in Seattle that look at wind speeds, currents, sat imagery, drift buoys, fixed buoys, observations from team.
- Run the model twice a day. That raw product gets put into a GIS and the format you're used to.
- If you were tracking someone driving cross-country; on day 1 Chicago, day 2 … If they didn't make it to Chicago within the first day, we'd reinitialize the info from the latest developments.

- Oil has changing characteristics: can have different windage (how high it floats in the water).
- Similar to a dingy floating on the water empty or loaded down with water – would move differently
- As oil weathers and ages, it gets denser and moves differently – not as fast.
- Not as easy as giving someone a model and telling them to run it. We have years of dealing with oil.

- "Ensemble of different models" -- Other people have oil models and current models.
- We're not just using NOAA's models but considering others, e.g. Texas Channel Lands Office (Buzz Martin) and Norwegians
- Other people can model oil. Don't know if they're actively running – some companies do oil spill modeling like Flag Sciences Associated. Usually for planning/preparedness

- We reserve the right to get smarter and revise the maps

Mike Smith, AFP **May 6, 20210**

Synopsis: EPA looking at the environmental effects of dispersants; it's always a matter of tradeoffs. Booms are helpful only in very calm waters, different size/strength. Best cleanup method is to fight it offshore – not to say there aren't impacts there, but shoreline habitats are more sensitive to oiling and more difficult to clean. Marches are harder to clean than beaches.

I understand you stopped dispersants for now. What are the best tools right now?
- Primary focus to collect as much as possible using skimmers and booms.
- Two burns yesterday.
- They're basically using all the tools they have available.
- On the shoreline the major focus has been preventive booming – floating barriers to keep the oil from sensitive areas.

How were the burns?
- Successful – couple hundred barrels burned but technique really dependent on good weather.
- We may do it again today but weather is getting tough – wind and being able to contain the oil enough to burn it.

What are the concerns about dispersants on marine environment?
- Any response technology is a tradeoff and the idea is to make the best decision possible.
- EPA looking at the environmental side of dispersant use.
- It is a tool we can use just like other tools.

Doesn't take much wind to override booms. Are they worth it?
- There are different types of booms.
- Ocean or harbor – different size/strength.
- Ones for open ocean are taller.
- The challenge with booming is that they need to be tethered because as winds move them around, they need to be kept secure and oriented properly to be effective.

Have there been major impacts on marine life?
- We're concerned with that and looking at It carefully.
- Efforts underway to document the larger species like mammals and birds and look at effect of fisheries.
- That is a concern after any spill and this is a large spill.
- We haven't seen a lot of fish mortality yet but there's still a lot of oil coming out and still a lot of oil on the surface.

Several reports of oil reaching shores in Chandeleur Islands and Knee Island. Heard you anything?
- We have seen some landfall on the tips of the islands.
- As far as I know that's the only landfall so far. We'll get more updates at the end of today.

As far as cleanup efforts – apart from capping the leak, is the best option to keep it out at the Gulf at all costs and keep it from the marshes?
- That's the goal – to fight it offshore. That's still the primary focus.
- Not to say there aren't impacts out there, but it's a tradeoff.
- Shoreline habitats are more sensitive to oiling and more difficult to clean.
- Imagine cleaning oil spread over vegetation in a mud flat – much tougher challenge.
- How far/how much to clean being evaluated. Don't want to inadvertently damage wetlands.

How do you clean wetlands/ Burn? Flood?
- We've had Gulf spills before.
- Used burning on the shoreline.
- First area impacted here are Barrier Islands.
- Know there's already oil there, well within our trajectory forecasts.
- Sand islands but some islands have pockets of marsh land.

Curtis Morgan, Miami Herald **May 6, 2010**

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Composition of the oil?
- Still trying to get a better characterization and tough to get a fresh sample.
- Some samples from skimmers but don't know how old it is
- Some samples collected at sea surface that are being analyzed
- Couple very small samples from sea floor by ROV

Would all samples have been exposed to dispersant?
- Subsea dispersant was an operational test – leaking for two weeks. Those operational tests were a few hours here and there.
- Most oil at the surface was probably not treated at the sea floor but I don't have any exact numbers.

- Well has never produced a drop of oil before it blew out.

Some 300 types of oil listed on NOAA site … how do you classify it?
- Look at ADIOS information.
- Very light South LA crude
- Other platforms within a few miles of this one that are producing; formations they're drilling in are all different, but that's a good approximation
- Some subtleties in trace elements

- ADIOS is a model you can download. First order weathering model. Can enter 500 different oil types including a couple different LA crude …

What happens over time is hard because we don't know exactly what this is. Correct?
- We're trying to better understand it and figure out from a couple different parameters. Namely density – float or sink?
- Definitely a floater. Mixing with water – that's why you see orange/red streaks – oil mixed with water.
- Forms an emulsion – will it break down when you stop mixing it?
- How much will disperse/evaporate? All questions we're looking at.

In terms of subsurface, does dispersant make it heavier/sink it? More dense and sink?
Any sense that subsurface volume/tracking is difficult. Do you understand if it's trailing underwater?
- Some models/efforts to get samples from different locations in water column
- The dispersant tests on the sea floor are ongoing and we don't know the behavior. Relatively small normal droplets being released – oil from cracks coming out in different size droplets/rates. Larger globules faster than smaller.
- Have some models. Our models say it will surface e – maybe 2-3 hours with smaller globs taking longer Then forms a slick
- Someone might say there's a huge amount on the bottom. Hard to disprove. According to our understanding of the physics, we don't believe that.

- If it stays on surface, over reef beds. If it's trailing, different issue
- Oil will naturally disperse anyway. Up to 10% disperses naturally at the end of the spill – will account for how much in different areas.

Mainly a superficial slick without a large volume of subsurface oil?

- Not superficial. Natural product – two liquikds mixing together. There will be some oil dispersing naturally but the idea of a cloud hanging with it is not a good visual
surface oil will move differently and dispersed oil will degrade in a different way from surface oil
really tiny droplets have more surface area – faster to degrade and biodegrade

Loop Current was not on the radar at start. Has anything changed about slick getting drawn into current within 72 window?
- Not within 72-hr window right now. More immediate concern now is how far to the west might it go, hence uncertainty bound
- This oil has to go a fair ways south before getting caught in Loop Current or Loop Current has to meander North
- Both could happen but unlikely within our 72-hr timeframe

Texas A&M professor thought best thing to happen would be for oil to get into loop and maybe evaporate/disperse in warmer water. Microbes that eat oil ..
- Natural process where oil degrades. Gulf as a whole is fairly warm. Not sure if moving from Mississippi water to Florida water would change things.
- We should expect water to degrade more quickly in Gulf of Mexico than Alaska, but Florida may not make much of a difference.

Expect much to come to Florida?
- 15 days into this now … still for the most part stayed in the general area
- We'd have to have some process come through to change that
- Oil continues to spill and the more oil you get, the more concern
- Keep in mind we could forecast 99.9% oil correctly but 1% of the oil could be a concern to someone. -- -
- Some things that blow the resolution of the model.

Chris Henwood, Reuters TV "Insider" **May 7, 2010**

Synopsis: If a hurricane approaches, all platforms would be evacuated and all boats would scatter; even without the spill that's standard operating procedure even without the spill. Would mean no response though – no skimming, burning, dispersants, etc. Localities will have to make decisions about bringing in booms or letting them get shredded depending on hurricane trajectory. Idea of oil weakening hurricane unlikely because it wouldn't be a consistent cohesive slick – too churned up by winds.

Potential consequences if hurricane comes into Gulf of Mexico with oil slick in place. What kind of disruptions would that cause?
- If big hurricane and no spill, all platforms evacuated and work boats scatter, small boats pulled away on trailers

Would they be quicker to stop operations now?
- Haven't heard anything yet. SOP regardless.
- More vessels involved now and some of those are specialized vessels tending booms and skimming. Not normally at sea. They may scatter sooner
- Operationally, that evacuation would shut things down – stop drilling relief wells, stop skimming, dispersants
- On shoreline, the entire boom is a concern; could get displaced even in a mild windstorm. Should you pull those back before a storm or leave them out and have them shredded in the storm?
- Don't know what the decision would be on that – each sector dealing with the spill would deal with it.
- As booms spread from Panhandle to LA, hurricane won't hit all areas at once. LA and FL may do different things depending on hurricane trajectory
- Storm surge – booms could wind up miles inland.

Would oil get pushed along with everything else?
- Picture after Rita or Ida – debris in marshes, fields. That could potentially be oily debris.
- It wouldn't necessarily be a lot of oil. During Hurricane Katrina, roughly 8 m miles of oil spilled. Such turbulent wind and mixing, it didn't pile up in any major quantity.
- After Katrina, it wasn't necessarily the oil in the land – tank farms damaged. After it passed through, that tank may have still leaked until it was secured. You could have the same thing here – hurricane could cause a bunch of collateral spills.

Read that some people talking about spraying oily substance over water to weaken hurricanes. Any comment? Purely hypothetical?
- Hypothetical. You have to have the cohesive slick for that effect to happen. The oil slick might in theory help reduce the intensity of storm because limits evaporation of sea surface, but that assumes it's a cohesive slick. The winds will actually break up the slick and it won't be in a layer that prevents evaporation. Those thin layers of oil will disappear and normal hurricane process would happen.

Loop Current – if it moves further south and up to Florida … Validity/probability?
- We're in 72-hour forecast window
- We're monitoring Loop Current location, movement of oil. Maybe 70-80 miles away today but it varies.
- We don't see this major shift in our forecast window right now.

Most spills are tankers springing a leak or pipelines bursting. This seems unique b/c oil 5,000 ft under the ocean surface. Are there special considerations because of the depth?
- It's challenging place to work. Trying to get a good sense of the oil itself is hard because it's tough to get a sample before it mixes with the water.
- Chemical composition is important to understand how it moves/behaves. It's not as well characterized – every oil is a little different. We got some samples from ROV but most are from the surface and the oil has already changed.

Looking at maps with areas of spill, days where the area semes to contract but oil still coming. Why?
- That's why we have been reluctant to talk about total area – changes each day

Robert Zullo, Houma Courier **May 7, 2010**

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Movement of oil – thinking about where it will go including yesterday's observations by aircraft and satellite.
- Forecast yesterday showed a piece of the slick moving westward. It's light sheen per toolbar at the bottom of the map.
- We're seeing a slow drift to the west per the models, but no confirmation at least today yet. It's moving there but it has to get across the river convergence area.

Potential for just drifting? Come ashore?
- In our trajectory projects, uncertainty bound. Red dots are where we predict oil may beach. Not predicting any beyond tip of the Passes within our 72-hr forecast zone.
- Boxes on trajectory map show the percent of distribution.

What makes this hard to predict?
- We're mixing one liquid with another. Modeling is challenging to begin with.
- Here, oil has different ages – some of the oil was released yesterday mixed with 2-week-old oil.
- As oil ages and weathers, it takes on different properties, which change how the oil moves in the water.
- Other challenge – wind has been light these last few days; currents also moving the oil.
- We have some drift buoys in the area to see how they move. Those reports are coming back and consistent with our models. Some oil north, east and west.

- If you look at currents and winds, they're not uniform across the area – the oil is not moving in one unified direction and it's not receiving the same currents and winds.
- Mouth of Mississippi is a big modeling challenge. Draining half of N. America right where water comes ashore.
- Currents, salinity gradient (salt/fresh water mixing)
- Sediment-laden river water mixing with seawater
- Could be one of the reasons it's stayed where it is
- If you've ever spilled the packing noodles from a box, they don't all stay on one spot on your floor. Then add winds. These patches may be in the same ocean but not being hit by the same winds/currents at the same time.

What would help in terms of weather?
- Remain calm so we can use burning and skimming
- For dispersants, you need a little turbulence on the surface to mix but if you're skimming/burning, you want it as calm as possible
- Most favorable wind direction probably depends on which state you're from
- Reinitialize models every day – 2x.
- If you're driving across country, you can drive 500 miles a day so we can predict where you'll be. But if you stop, the trajectory needs to be reinitialized. We're making new predictions every day to account for changes.

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Received(Date): Mon, 10 May 2010 06:15:19 -0400
From: David Mcclellan <David.Mcclellan@noaa.gov>
Subject: [Fwd: [Fwd: Fw: Oil and RVC]]
To: Andy David <Andy.David@noaa.gov>
[Fwd: Fw: Oil and RVC].eml
David_mcclellan.vcf

Andy,
I have sent your email regarding "Oil Spill Diving" to the PI's for the Dry Tortugas cruise aboard the MV Spree this summer, May 13-23 and June 9-19. We have been ordered to write "oil or no oil" on our data sheets (see below). Please give me a better definition of when I should suspend diving, if this is necessary. Would this be an oil sheen, presence of tar balls, or actual floating oil. I can hear the arguments already.
Dave Mc

Received(Date): Sat, 08 May 2010 13:40:20 -0400 (EDT)
From: "Jerald S. Ault" <jault@rsmas.miami.edu>
Subject: [Fwd: Fw: Oil and RVC]
To: steve.smith@rsmas.miami.edu, Jim.Bohnsack@noaa.gov, David.Mcclellan@noaa.gov

FYI

----- Original Message -----
From: David Hallac
Sent: 05/08/2010 10:59 AM EDT
To: Matt Patterson
Subject: Re: Oil and RVC

Thanks, Jerry - the RVC at DRTO is serving as a baseline condition assessment as part of the NPS pre-oil condition assessment plan. We'll be in touch soon.

----- Original Message -----
From: Matt Patterson
Sent: 05/08/2010 10:46 AM EDT
To: "Jerald S. Ault" <jault@rsmas.miami.edu>
Cc: David Hallac
Subject: Re: Oil and RVC

We hope so as well, but we really need it on the data sheets in the comments with "oil" or "no oil" as a record for potential litigation.

Matt

----- Original Message -----
From: "Jerald S. Ault" [jault@rsmas.miami.edu]
Sent: 05/08/2010 10:29 AM AST
To: Matt Patterson
Cc: "Jerald S. Ault" <jault@rsmas.miami.edu>; David Hallac
Subject: Re: Oil and RVC

Matt, We will absolutely let you know ... hopefully the observations will be zero! Jer

> Jer, can you please insist that all fish counters add in the comments for
> all sites "oil" or "no oil" observed during the dive, pretty please.
>
> Matt
>
>
> ----- Original Message -----
> From: "Jerald S. Ault" [jault@rsmas.miami.edu]
> Sent: 04/26/2010 02:43 PM AST
> To: randall.kosaki@noaa.gov; Dan Kimball; Mark Lewis;
> billy.causey@noaa.gov; jim.bohnsack@noaa.gov; sean.morton@noaa.gov;

> mark.robson@myfwc.com; jennifer.koss@noaa.gov;
> bob.g.ballard@dep.state.fl.us; kacky.andrews@noaa.gov;
> jennifer.schull@noaa.gov; mark.monaco@noaa.gov; robert.brock@noaa.gov;
> richard.appeldoorn@upr.edu; samuel.pooley@noaa.gov; gregg.waugh@safmc.net;
> steve.bortone@gulfcouncil.org; Matt Patterson;
> chantal.collier@dep.state.fl.us; jamie.monty@dep.state.fl.us;
> luiz.barbieri@myfwc.com; gil.mcrae@myfwc.com
> Cc: todd.kellison@noaa.gov; steve.smith@rsmas.miami.edu;
> nzurcher@rsmas.miami.edu
> Subject: May 4th - Coral Reef Fish-Habitat Modeling Workshop
>
>
>
> Colleagues,
>
> Attached is a draft agenda for next weekÃ*Â*s Ã*Â*Coral Reef Fish-Habitat
> Modeling to Support Fisheries and Ecosystem ManagementÃ*Â* workshop.
>
> Date: May 4, 2010
> Location: Library Map & Chart Room, UM Rosenstiel School
> Time: 0830-1600
>
> FYI, the University of Miami has a special arrangement with the following
> hotel:
>
> Courtyard by Marriott
> Miami-Coconut Grove
> 2649 S. Bayshore Drive
> Miami, FL 33133
> 1-888-249-3819
> Corporate Code: University of Miami
> $92.00 Standard
>
> We are looking forward to seeing you soon.
>
> Jerry Ault
> Steve Smith
> Todd Kellison

Jerald S. Ault, Ph.D.
Professor of Marine Biology and Fisheries
Rosenstiel School of Marine and Atmospheric Science
University of Miami, 4600 Rickenbacker Causeway
Miami, FL 33149 jault@rsmas.miami.edu
(305)421-4884 ph (305)421-4791 fax
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David McClellan

Fisheries Research Biologist, Unit Dive Supervisor

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PR&B Division, FAME Unit

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David.McClellan@noaa.gov (Internet)

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Version
2.1

Received(Date): Mon, 10 May 2010 10:50:33 -0400
From: Samuel Rauch <Samuel.Rauch@noaa.gov>
Subject: Re: Sub-Surface Modeling of Oil and Determining Fisheries Closure
To: "'Brian.T.Pawlak@noaa.gov'" <Brian.T.Pawlak@noaa.gov>,"'steve.murawski@noaa.gov'" <Steve.Murawski@noaa.gov>,"'Samuel.Rauch@noaa.gov'" <Samuel.Rauch@noaa.gov>,"'Eric.Schwaab@noaa.gov'" <Eric.Schwaab@noaa.gov>,"'Jenni.Wallace@noaa.gov'" <Jenni.Wallace@noaa.gov>,"'Lauren.B.Lugo@noaa.gov'" <Lauren.B.Lugo@noaa.gov>,"'john.oliver@noaa.gov'" <John.Oliver@noaa.gov>,"'nancy.thompson@noaa.gov'" <Nancy.Thompson@noaa.gov>,"'bonnie.ponwith@noaa.gov'" <Bonnie.Ponwith@noaa.gov>
Cc: "'Steven.Wilson@noaa.gov'" <Steven.Wilson@noaa.gov>,"'John.Rapp@noaa.gov'" <John.Rapp@noaa.gov>,"'Michael.S.Gallagher@noaa.gov'" <Michael.S.Gallagher@noaa.gov>,"'Buck.Sutter@noaa.gov'" <Buck.Sutter@noaa.gov>

If we were going to close based on subsurface spread, we would need more than anecdotal information. We are already suffering from inaccurate surface models. Would the subsurface models be any better? I don't know but if they are, they would potentially be a basis to close.

If not, we are sampling both surface and subsurface and the message should be that we are going to close any fishery area that is impacted by the oil.

----- Original Message -----
From: Brian Pawlak <Brian.T.Pawlak@noaa.gov>
To: Steve Murawski <Steve.Murawski@noaa.gov>; Samuel Rauch <Samuel.Rauch@noaa.gov>; Eric Schwaab <Eric.Schwaab@noaa.gov>; Jenni Wallace <Jenni.Wallace@noaa.gov>; Lauren B Lugo <Lauren.B.Lugo@noaa.gov>; John Oliver <John.Oliver@noaa.gov>; Nancy Thompson <Nancy.Thompson@noaa.gov>; Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>
Cc: Steven Wilson <Steven.Wilson@noaa.gov>; John Rapp <John.Rapp@noaa.gov>; Michael S Gallagher <Michael.S.Gallagher@noaa.gov>; Buck Sutter <Buck.Sutter@noaa.gov>
Sent: Mon May 10 09:58:36 2010
Subject: Sub-Surface Modeling of Oil and Determining Fisheries Closure

Dr. Lubchenco asked NMFS this morning for an understanding of how we would consider sub-surface modeling of oil and using that in making a determination to close Federal waters to fishing. This question is distinct from the Seafood safety questions Lauren Lugo sent out this morning. Those questions regarding seafood safety were asking if we are sampling in areas without known oil, or a known trajectory of oil, to determine safety. Dr. Lubchenco's noted that if we are being precautionary and making a closure based on trajectory of a spill at the sea surface, shouldn't we be considering closure based on sub-surface oil that might be outside of our trajectories either through modeling or actual known samples (she referenced the Dauphin Island anecdotal observations of tar balls in plankton tows at depth).

In short, I think we need a response to how we would begin to analyze this and what information we would need/use. Ideas for how to approach?

--

Brian Pawlak
Deputy Director
NOAA Fisheries Service
Office of Habitat Conservation
301-713-2325 (167)

301-713-1043 (Fax)

Received(Date): Tue, 11 May 2010 11:46:07 -0400
From: Samuel Rauch <Samuel.Rauch@noaa.gov>
Subject: [Fwd: FW: IOOS Sources for benthic current/circulation measurements inGOM]
To: Roy Crabtree <Roy.Crabtree@noaa.gov>
gom-all-currents.xlsx
gom-all-currents.csv
gom-all-currents.kml
gom-benthic-currents.xlsx
gom-benthic-currents.csv
gom-benthic-currents.kml

Is there anything in here we can use for subsurface distribution?

-------- Original Message --------

Subject: FW: IOOS Sources for benthic current/circulation measurements in GOM
Date: Tue, 11 May 2010 09:29:23 -0400
From: Christopher.S.Moore <Christopher.S.Moore@noaa.gov>
Reply-To: Christopher.S.Moore@noaa.gov
Organization: NOAA
To: Deepwater.HorizonDist@noaa.gov
CC: 'Zdenka S. Willis' <Zdenka.S.Willis@noaa.gov>, 'Jane Lubchenco' <Jane.Lubchenco@noaa.gov>

Information from the NOAA IOOS Program.

For further questions, please contact zdenka.s.willis@noaa.gov

Original Message
From: sam.walker [mailto:Sam.Walker@noaa.gov]
Sent: Monday, May 10, 2010 6:09 PM
To: Christopher.S.Moore@noaa.gov
Cc: Jack Harlan; Zdenka Willis; Suzanne Skelley; James.Verlaque; Carl Gouldman; Charles Alexander; Jennie Lyons
Subject: IOOS Sources for benthic current/circulation measurements in GOM

1700 (ET), 10 May 2010

RE: IOOS sources for benthic current/circulation measurements in GOM

Hi Chris

In response to your inquiry, we have compiled several pieces of information. Right now one of the best sources for benthic circulation data is from the private platforms in the Gulf. There are other sources, but those tend to be near surface and near shore stations.

What I have put together, with the outstanding assistance of the GCOOS and SECOORA Regional Associations (special thanks to Matt Howard with TAMU and

Vembu Subramanian with USF) is largely a list of MMS leased platforms in the Gulf. Each of them is supposed to be providing locations along with full water column profiling. I can't speak to whether those thresholds are being met, but we have been able to compile the basics (location, depth of measurement, owner, etc.) for these platforms hosting ADCPs.

Attached files (gom benthic currents.*) include:

1. Excel spreadsheet showing locations/details of stations measuring current at depth
2. Redundant spreadsheet in CSV format
3. Accompanying KML for map based display

You can also access the sub surface current measurements via NDBC's web site. In order to view actual measurements go here: http://www.ndbc.noaa.gov, and then select "Oil and Gas Industry" under the "Program Filter" (above/left of map window) and then clicking on the point(s) of interest.

Additional (slightly time delayed) water column current outputs based on the MMS related platforms can be found here: http://gcoos.tamu.edu/products/recent_observations.html.

A separate spreadsheet, csv, and associated KML file set (gom all currents.*) shows locations of near shore, near surface current measurements from federal and non federal sources in the Gulf (not including HF Radar based surface currents). Assume that these would also prove useful for any modeling efforts, though not as detailed as the files MMS dominated files, mentioned above.

If you don't already have one, suggest finding a POC within the Minerals Management Service (MMS) who could provide more detail on the specifics/conditions for the oceanographic measurements required on the private rigs. Dick Crout with NDBC (richard.crout@noaa.gov <mailto:richard.crout@noaa.gov>) is probably a good starting point for finding a relevant person at MMS. Also, Walter Johnson (walter.johnson@mms.gov <mailto:walter.johnson@mms.gov>) is the MMS representative to the Interagency Working Group (IWGOO) on Ocean Observations (IWGOO) and directly involved in the oil spill modeling community.

What is missing from this inventory are any of the ephemeral measurements (e.g., AXCPs) that are being deployed via aircraft or ship specifically for the response to this incident. You already know about some of those (via Nick Shay/UMiami and AOML) and there might be others.
As far as I know there is no centralized aggregation point for those near real time data. Please let us know if there is such a "go to" site for these short term deployments (I can follow up with Nick Shay also).

Let us know if you are interested in related information (e.g., regional 3 D or circulation modeling expertise; institutions with idle ADCPs/gliders/AUVs) if useful, we can track some of that down for you as well via our regional IOOS partners. We are also looking into additional sources of sub surface current flow/temperature/salinity in the GOM and will send along an update soonest.

Best,

Sam

P.S. I'll be on detail from 1200 1900 (ET) tomorrow, Tuesday 11 May, at the NOAA ICC in Silver Spring. I should be fairly accessible via email/phone for follow up.

Samuel P. Walker, PhD
Senior Technical Data Manager
NOAA Integrated Ocean Observing System (IOOS) Program 1100 Wayne Avenue, Suite 1225 Silver Spring, MD 20910 301.427.2450 office
301.427.2073 fax
803.807.1189 mobile
sam.walker@noaa.gov
http://ioos.gov

1700 (ET), 10 May 2010

RE: Sources for benthic circulation measurements in GOM

Hi Chris

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Sam

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region	operator	name	longitude	latitude	status	parameter	data uri
GCOOS	USF/COMF	C16	-84.22	27.46	Offline (20	Currents	http://comps.marine.u
GCOOS	USF/COMF	C17	-82.219	25.254	Offline (20	Currents	http://comps.marine.u
GCOOS	WAVCIS	CSI09	-89.5869	29.609	Operating	Currents	
GCOOS	WAVCIS	CSIFTW	-86.458	30.2357	Operating	Currents	http://www.wavcis.lsu
GCOOS	Amerada H	Stenna For	-90.532	27.504	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Maersk Dr	Maersk De	-91.189	26.442	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	BP Inc	Developm	-88.363	28.731	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Chevron	Discoverer	-92.377	26.237	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Noble Ene	ENSCO 85(	-88.251	28.469	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Noble Ene	Discoverer	-89.389	28.43	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Shell Inter	Frontier D	-90.57	27.73	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Marathon	Ocean Mo	-90.619	27.454	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Chevron	Discoverer	-90.754	27.316	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Devon Ene	West Sirius	-92.492	26.738	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Anadarko	ENSCO 85(	-90.794	27.084	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Amerada H	Ocean Bar	-92.298	27.599	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	LLOG	Lorris Bouz	-88.834	28.77	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	BHP Billito	Developm	-90.715	27.161	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	ExxonMob	Ocean End	-92.06	27.066	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Shell Inter	Clyde Bouc	-94.9	26.13	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Anadarko	Independe	-87.986	28.085	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Anadarko	Belford Do	-90.305	27.396	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	BP Inc	Thunder H	-88.496	28.191	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Murphy Ex	Medusa - I	-89.465	28.394	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Murphy Ex	Front Runr	-90.441	27.625	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	ENI Petrole	Transocea	-88.361	27.554	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	BP Inc	Developm	-90.032	27.225	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Anadarko	Discoverer	-88.155	27.957	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Shell Inter	Cajun Expr	-89.29	28.18	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Marathon	Paul Roma	-90.73	27.726	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	BHP Billito	C R Luigs -	-90.601	27.411	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	BP Inc	Deepwate	-93.268	26.878	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Anadarko	Amos Runi	-90.403	27.015	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Murphy Ex	Ocean Cor	-88.468	28.241	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	Energy Res	Transocea	-88.393	28.023	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Shell Inter	Jim Thomp	-89.132	28.118	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	Shell Inter	Perdido He	-94.898	26.129	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	BHP Billito	Neptune -	-89.924	27.37	Operating	Currents	http://ndbc.noaa.gov/

GCOOS	Kerr-McGe	Gunnison -	-93.538	27.304	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	Shell Inter	Mars - Mis	-89.22	28.16	Operating	Currents	http://ndbc.noaa.gov/
GCOOS	Shell Inter	Ram-Powe	-88.09	29.06	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	Kerr-McGe	Red Hawk	-91.959	27.122	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	BP Inc	Holstein -	-90.536	27.321	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	Kerr-McGe	Boomvang	-94.625	27.354	Operating	Currents	http://ndbc.noaa.gov/
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GCOOS	USF/COMF	C10	-82.92	27.169	Operating	Currents	http://comps.marine.u
GCOOS	TAMU-CC/	116: TWDE	-95.8871	28.7152	Offline (20	Currents	http://lighthouse.tam
GCOOS	WAVCIS	CSI15	-90.4992	28.4999	Operating	Currents	http://www.wavcis.lsu
GCOOS	WAVCIS	CSI06	-90.29	28.53	Operating	Currents	http://www.wavcis.lsu
GCOOS	TAMU-CC/	068: Baffir	-97.4049	27.29702	Offline (20	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	167: North	-88.5641	30.35978	Offline (20	Currents	http://lighthouse.tam
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GCOOS	TABS	TABS Buoy	-94.9186	28.9818	Operating	Currents	http://tabs.gerg.tamu
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GCOOS	TAMU-CC/	114: TWDE	-95.7439	28.7456	Offline (20	Currents	http://lighthouse.tam
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GCOOS	TAMU-CC/	194: Rainb	-93.8714	29.97944	Operating	Currents	http://lighthouse.tam
GCOOS	WAVCIS	CSI03	-92.0368	29.2647	Operating	Currents	http://www.wavcis.lsu
GCOOS	TAMU-CC/	137: Packe	-97.2371	27.63447	Offline (20	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	138: Packe	-97.2154	27.62281	Operating	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	058: Lavac	-96.5825	28.6197	Offline (20	Currents	http://lighthouse.tam
GCOOS	WAVCIS	CSI16	-89.0213	29.2407	Operating	Currents	http://www.wavcis.lsu
GCOOS	USF/COMF	C13	-83.073	26.063	Operating	Currents	http://comps.marine.u

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GCOOS	TAMU-CC/	193: West	-93.9644	29.82389	Operating	Currents	http://lighthouse.tam
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GCOOS	TAMU-CC/	068: Baffir	-97.4049	27.29702	Offline (20	Currents	http://lighthouse.tam
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GCOOS	Central Gu	USM3m01	-88.65	30.04	Offline (20	Currents	http://www.cengoos.c
GCOOS	Central Gu	USM3m01	-88.65	30.04	Offline (20	Currents	http://www.cengoos.c
GCOOS	TAMU-CC/	119: Port l	-96.5957	28.6518	Offline (20	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	191: Port c	-94.0861	30.07972	Operating	Currents	http://lighthouse.tam
GCOOS	USF/COMF	C12	-83.721	27.498	Operating	Currents	http://comps.marine.u
GCOOS	TAMU-CC/	106: RTNS	-97.202	27.8191	Operating	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	155: Choct	-88.0351	30.67931	Offline (20	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	123: Mark	-96.3552	28.4488	Offline (20	Currents	http://lighthouse.tam
GCOOS	WAVCIS	CSI05	-90.32	29.32	Operating	Currents	http://www.wavcis.lsu
GCOOS	TAMU-CC/	122: Pass C	-96.3965	28.3861	Offline (20	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	058: Lavac	-96.5825	28.6197	Offline (20	Currents	http://lighthouse.tam
GCOOS	TAMU-CC/	100: RTNS	-96.9819	27.75694	Offline (20	Currents	http://lighthouse.tam

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ucc.edu/pq/106/vlx
ucc.edu/pq/155/vlx
ucc.edu/pq/123/vlx
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1700 (ET), 10 May 2010

RE: Sources for benthic circulation measurements in GOM

Hi Chris-

Right now one of the best sources for benthic circulation data is from the private platforms in the Gulf. There are other sources, but those tend to be near-surface and near-shore stations.

What I have put together, with the outstanding assistance of the GCOOS and SECOORA Regional Associations (special thanks to Matt Howard with TAMU and Vembu Subramanian with USF) is largely a list of MMS-leased platforms in the Gulf. Each of them is supposed to be providing locations along with full water-column profiling. I can't speak to whether those thresholds are being met, but we have been able to compile the basics (location, depth of measurement, owner, etc.) for these platforms hosting ADCPs.

Attached files (gom-benthic-currents.*) include:

1. MS Excel spreadsheet showing locations/details of stations measuring current at depth
2. Redundant spreadsheet in CSV format
3. Accompanying KML file for map-based display

You can also access the sub-surface current measurements via NDBC's web site. In order to view actual measurements go here: http://www.ndbc.noaa.gov, and then select "Oil and Gas Industry" under the "Program Filter" (above/left of map window) and then clicking on the point(s) of interest.

Additional (slightly time-delayed) water column current outputs based on the MMS-related platforms can be found here: http://gcoos.tamu.edu/products/recent_observations.html.

A separate spreadsheet, csv, and associated KML file set (gom-all-currents.*) shows locations of near-shore, near-surface current measurements from federal and non-federal sources (not including HF Radar-based surface currents). Assume that these would also prove useful for any modeling efforts, though not as detailed as the files MMS-dominated files, mentioned above.

If you don't already have one, suggest finding a POC within the Minerals Management Service (MMS) who could provide more detail on the specifics/conditions for the oceanographic measurements required on the private rigs. Dick Crout with NDBC (richard.crout@noaa.gov) is probably a good starting point for finding a relevant person at MMS. Also, Walter Johnson (walter.johnson@mms.gov) is the MMS representative to the Interagency Working Group (IWGOO) on Ocean Observations (IWGOO) and directly involved in the oil spill modeling community.

What is missing from this inventory are any of the ephemeral measurements (e.g., AXCPs) that are being deployed via aircraft or ship specifically for the response to this incident. You already know about some of those (via Nick Shay/UMiami and AOML) and there might be others. As far as I know there is no centralized aggregation point for those near real-time data. Please let us know if there is such a "go-to" site for these short-term deployments (I can follow up with Nick Shay also).

Let us know if you are interested in related information (e.g., regional 3-D or circulation modeling expertise; institutions with idle ADCPs/gliders/AUVs) – if useful, we can track some of that down for you as well via our regional IOOS partners. We are also looking into additional sources of sub-surface current flow/temperature/salinity in the GOM and will send along an update soonest.

Best,
Sam

P.S. I'll be on detail from 1200-1900 (ET) tomorrow, Tuesday 11 May, at the NOAA ICC in Silver Spring. I should be fairly accessible via email/phone for follow-up.

region, operator, name, longitude, latitude, status, parameter, data uri
GCOOS, USF/COMPS, C16, -84.220000, 27.460000, Offline (2010-05-10T03:00:00Z), Currents, http://comps.marine.usf.edu/C16
GCOOS, USF/COMPS, C17, -82.219000, 25.254000, Offline (2010-05-10T03:00:00Z), Currents, http://comps.marine.usf.edu/C17
GCOOS, WAVCIS, CSI09, -89.586900, 29.609000, Operating (2009-04-15T12:36:19Z), Currents,
GCOOS, WAVCIS, CSIFTW, -86.457970, 30.235700, Operating (2009-04-15T12:36:19Z), Currents, http://www.wavcis.lsu.edu/sos/server.asp
GCOOS, Amerada Hess Corporation, Stenna Forth - Green Canyon 469, -90.532000, 27.504000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42919
GCOOS, Maersk Drilling USA, Maersk Developer - Walker Ridge 543, -91.189000, 26.442000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42915
GCOOS, BP Inc, Development Driller 3 - Mississippi Canyon 252, -88.363000, 28.731000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42916
GCOOS, Chevron, Discoverer Inspiration - Keathley Canyon 736, -92.377000, 26.237000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42917
GCOOS, Noble Energy Inc, ENSCO 8501 - Mississippi Canyon 519, -88.251000, 28.469000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42913
GCOOS, Noble Energy Inc, Discoverer Americas - Mississippi Canyon 540, -89.389000, 28.430000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42914
GCOOS, Shell International E&P, Frontier Driller - Green Canyon 248, -90.570000, 27.730000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42910
GCOOS, Marathon Oil, Ocean Monarch - Green Canyon 511, -90.619000, 27.454000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42911
GCOOS, Chevron, Discoverer Clear Leader - Green Canyon 640, -90.754000, 27.316000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42912
GCOOS, Devon Energy, West Sirius - Walker Ridge 250, -92.492000, 26.738000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42908
GCOOS, Anadarko Petroleum Corporation, ENSCO 8500 - Green Canyon 903, -90.794000, 27.084000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42909
GCOOS, Amerada Hess Corporation, Ocean Baroness - Garden Banks 386, -92.298000, 27.599000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42892
GCOOS, LLOG, Lorris Bouzigard - Mississippi Canyon 199, -88.834000, 28.770000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42894
GCOOS, BHP Billiton, Development Driller 1 - Green Canyon 817, -90.715000, 27.161000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42897
GCOOS, ExxonMobil, Ocean Endeavor - Keathley Canyon 919, -92.060000, 27.066000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42899
GCOOS, Shell International E&P, Clyde Boudreaux - Alaminos Canyon 857, -94.900000, 26.130000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42902
GCOOS, Anadarko Petroleum Corporation, Independence Hub - Mississippi Canyon 920, -87.986000, 28.085000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42904
GCOOS, Anadarko Petroleum Corporation, Belford Dolphin - Green Canyon 561, -90.305000, 27.396000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42905
GCOOS, BP Inc, Thunder Horse - Mississippi Canyon 778 , -88.496000, 28.191000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42887
GCOOS, Murphy Exploration & Production Company, Medusa - Mississippi Canyon 582, -89.465000, 28.394000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42889
GCOOS, Murphy Exploration & Production Company, Front Runner - Green Canyon 338, -90.441000, 27.625000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42890
GCOOS, ENI Petroleum, Transocean Marianas - Atwater Valley 428, -88.361000, 27.554000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42881
GCOOS, BP Inc, Development Driller II - Green Canyon 743, -90.032000, 27.225000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42885

GCOOS, Anadarko Petroleum Corporation, Discoverer Spirit - Atwater Valley 37 #3, -88.155000, 27.957000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42886
GCOOS, Shell International E&P, Cajun Express - Mississippi Canyon 762, -89.290000, 28.180000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42877
GCOOS, Marathon Oil, Paul Romano - Green Canyon 244, -90.730000, 27.726000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42878
GCOOS, BHP Billiton, C R Luigs - Green Canyon 555, -90.601000, 27.411000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42871
GCOOS, BP Inc, Deepwater Horizon - Keathley Canyon 102, -93.268000, 26.878000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42872
GCOOS, Anadarko Petroleum Corporation, Amos Runner - Green Canyon 956, -90.403000, 27.015000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42875
GCOOS, Murphy Exploration & Production Company, Ocean Confidence - Mississippi Canyon 737, -88.468000, 28.241000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42869
GCOOS, Petrobras - USA, DeepSeas - Walker Ridge 469, -90.531000, 26.520000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42867
GCOOS, BP Inc, Discoverer Enterprise - Mississippi Canyon 778 #2, -88.502000, 28.225000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42868
GCOOS, Energy Resources Technologies/Remington, Transocean Amirante - Mississippi Canyon 956, -88.393000, 28.023000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42866
GCOOS, Shell International E&P, Jim Thompson - Mississippi Canyon 765, -89.132000, 28.118000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42862
GCOOS, Newfield Exploration Company, Ocean Victory - Garden Banks 425, -92.518000, 27.573000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42863
GCOOS, Shell International E&P, Nautilus - Mississippi Canyon 392, -87.986000, 28.619000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42861
GCOOS, Chevron, Blind Faith - Mississippi Canyon 696, -88.266000, 28.340000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42385
GCOOS, Chevron, Tahiti - Green Canyon 641, -90.714000, 27.326000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42386
GCOOS, Murphy Exploration & Production Company, Thunderhawk - Mississippi Canyon 734, -88.399000, 28.267000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42387
GCOOS, Shell International E&P, Perdido Host - Alaminos Canyon 857, -94.898000, 26.129000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42390
GCOOS, ATP Oil & Gas Corporation, Titan - Mississippi Canyon 941, -89.101000, 28.034000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42391
GCOOS, BHP Billiton, Neptune - Green Canyon 613, -89.924000, 27.370000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42383
GCOOS, Kerr-McGee Oil and Gas Corporation, Gunnison - Garden Banks 668, -93.538000, 27.304000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42382
GCOOS, Shell International E&P, Auger - Garden Banks 426 , -92.490000, 27.550000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42361
GCOOS, Shell International E&P, Brutus - Green Canyon 158 , -90.670000, 27.800000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42362
GCOOS, Shell International E&P, Mars - Mississippi Canyon 807 , -89.220000, 28.160000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42363
GCOOS, Shell International E&P, Ram-Powell - Viosca Knoll 936 , -88.090000, 29.060000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42364
GCOOS, Shell International E&P, Ursa - Mississippi Canyon 809, -89.120000, 28.200000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42365
GCOOS, Kerr-McGee Oil and Gas Corporation, Red Hawk - Garden Banks 877, -91.959000, 27.122000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42366
GCOOS, ConocoPhillips, Magnolia - Garden Banks 783, -92.203000, 27.204000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42368

GCOOS, BP Inc, Holstein - Green Canyon 645, -90.536000, 27.321000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42370
GCOOS, Chevron, Genesis - Green Canyon 205, -90.519000, 27.779000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42372
GCOOS, Kerr-McGee Oil and Gas Corporation, Boomvang - East Breaks 643, -94.625000, 27.354000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42373
GCOOS, BP Inc, Na Kika - Mississippi Canyon 474, -88.289000, 28.521000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42375
GCOOS, Kerr-McGee Oil and Gas Corporation, Constitution - Green Canyon 680, -90.968000, 27.293000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42377
GCOOS, Anadarko Petroleum Corporation, Marco Polo - Green Canyon 608, -90.181000, 27.362000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42379
GCOOS, ATP Oil & Gas Corporation, Innovator - Mississippi Canyon 711, -89.616000, 28.221000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42381
GCOOS, Williams, Devil's Tower - Mississippi Canyon 773, -88.738000, 28.209000, Operating (2010-05-03T17:49:50Z), Currents, http://ndbc.noaa.gov/station_page.php?station=42380
GCOOS, TAMU-CC/Conrad Blucher Institute, 154: ASPA Pier E (mb0301), -88.042806, 30.721333, Offline (2010-05-10T04:00:23Z), Currents, http://lighthouse.tamucc.edu/pq/154/vlx
GCOOS, USF/COMPS, C10, -82.920000, 27.169000, Operating (2010-05-10T03:00:00Z), Currents, http://comps.marine.usf.edu/C10
GCOOS, TAMU-CC/Conrad Blucher Institute, 116: TWDB Current Meter at Gulf Cut, -95.887100, 28.715200, Offline (2010-05-10T04:00:23Z), Currents, http://lighthouse.tamucc.edu/pq/116/vlx
GCOOS, WAVCIS, CSI15, -90.499200, 28.499900, Operating (2009-04-15T12:36:19Z), Currents, http://www.wavcis.lsu.edu/csi15.asp?units=eng&table=WCIS15
GCOOS, WAVCIS, CSI06, -90.290000, 28.530000, Operating (2009-04-15T12:36:19Z), Currents, http://www.wavcis.lsu.edu/csi06.asp?units=eng&table=WCIS06
GCOOS, TAMU-CC/Conrad Blucher Institute, 068: Baffin Bay (87766041), -97.404910, 27.297020, Offline (2010-05-10T04:00:23Z), Currents, http://lighthouse.tamucc.edu/pq/068/vlx
GCOOS, TAMU-CC/Conrad Blucher Institute, 167: Northrop Grumman Current; Pascagoula; MS (ps0301), -88.564056, 30.359778, Offline (2010-05-10T04:00:23Z), Currents, http://lighthouse.tamucc.edu/pq/167/vlx
GCOOS, TAMU-CC/Conrad Blucher Institute, 190: USCG Sabine CU (sn0201), -93.870000, 29.728611, Operating (2010-05-10T04:00:23Z), Currents, http://lighthouse.tamucc.edu/pq/190/vlx
GCOOS, TAMU-CC/Conrad Blucher Institute, 121: Eastern Arm Current Meter, -96.227900, 28.527200, Offline (2010-05-10T04:00:23Z), Currents, http://lighthouse.tamucc.edu/pq/121/vlx
GCOOS, TABS, TABS Buoy B, -94.918600, 28.981800, Operating (2010-05-09T23:00:00Z), Currents, http://tabs.gerg.tamu.edu/Tglo/ven.php?buoy=B
GCOOS, TABS, TABS Buoy D, -96.842900, 27.939600, Operating (2010-04-23T19:30:00Z), Currents, http://tabs.gerg.tamu.edu/Tglo/ven.php?buoy=D
GCOOS, TABS, TABS Buoy F, -94.243300, 28.842500, Operating (2010-05-10T01:00:00Z), Currents, http://tabs.gerg.tamu.edu/Tglo/ven.php?buoy=F
GCOOS, TABS, TABS Buoy H, -96.543400, 27.867400, Offline (2007-10-16T01:00:00Z), Currents, http://tabs.gerg.tamu.edu/Tglo/ven.php?buoy=H
GCOOS, TABS, TABS Buoy J, -97.050700, 26.191400, Offline (2010-05-09T22:30:00Z), Currents, http://tabs.gerg.tamu.edu/Tglo/ven.php?buoy=J
GCOOS, TABS, TABS Buoy K, -96.499800, 26.216800, Operating (2010-05-09T20:30:00Z), Currents, http://tabs.gerg.tamu.edu/Tglo/ven.php?buoy=K
GCOOS, TABS, TABS Buoy N, -94.036700, 27.890300, Operating (2010-02-05T10:00:00Z), Currents, http://tabs.gerg.tamu.edu/Tglo/ven.php?buoy=N
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42362	Brutus - Green Canyon 158	Stationary	27.8	-90.67	-260.8	2780
42363	Mars - Mississippi Canyon 807	Stationary	28.16	-89.22	-174.2	2904
42364	Ram-Powell - Viosca Knoll 936	Stationary	29.06	-88.09	-167.6	3265
42365	Ursa - Mississippi Canyon 809	Stationary	28.2	-89.12	-197.2	2664
42368	Magnolia - Garden Banks 783	Stationary	27.204	-92.203	-5	
42370	Holstein - Green Canyon 645	Stationary	27.321	-90.536	-202.8	4317
42375	Na Kika - Mississippi Canyon 4	Stationary	28.521	-88.289	32.8	
42377	Constitution - Green Canyon 6	Stationary	27.293	-90.968	-231.6	2856
42380	Devil's Tower - Mississippi Can	Stationary	28.209	-88.738	-441.6	2016
42382	Gunnison - Garden Banks 668	Mobile	27.304	-93.538	-414.7	3049
42383	Neptune - Green Canyon 613	Stationary	27.37	-89.924	-253.3	2248
42385	Blind Faith - Mississippi Canyo	Stationary	28.34	-88.266	-258.2	2463
42386	Tahiti - Green Canyon 641	Stationary	27.326	-90.714	-316.6	2836
42390	Perdido Host - Alaminos Canyo	Stationary	26.129	-94.898	-207	3304
42862	Jim Thompson - Mississippi Ca	Mobile	28.004	-89.166	-207	3566
42863	Ocean Victory - Garden Banks	Mobile	27.573	-92.518	-141.1	2556
42867	DeepSeas - Walker Ridge 469	Mobile	26.52	-90.531	-111.9	2370
42868	Discoverer Enterprise - Mississ	Mobile	28.225	-88.502	-255.6	3825
42878	Paul Romano - Green Canyon	Mobile	27.726	-90.73	-141.4	3028
42881	Transocean Marianas - Atwate	Mobile	27.554	-88.361	-260.5	3830
42886	Discoverer Spirit - Atwater Val	Mobile	27.957	-88.155	-207.7	3567
42887	Thunder Horse - Mississippi Ca	Stationary	28.191	-88.496	-239.2	3284
42889	Medusa - Mississippi Canyon 5	Mobile	28.394	-89.465	-384.8	2058
42890	Front Runner - Green Canyon	Mobile	27.625	-90.441	-49.9	49.9
42897	Development Driller 1 - Green	Mobile	27.161	-90.715	-239.8	3337
42904	Independence Hub - Mississip	Mobile	28.085	-87.986	-261.8	2467
42909	ENSCO 8500 - Green Canyon 9	Mobile	27.084	-90.794	-260.2	2675
42910	Frontier Driller - Green Canyor	Mobile	27.73	-90.57	-207	2989
42911	Ocean Monarch - Green Canyo	Mobile	27.454	-90.619	-260.5	2045
42913	ENSCO 8501 - Mississippi Cany	Mobile	28.469	-88.251	-179.5	
42914	Discoverer Americas - Mississi	Mobile	28.43	-89.389	-141.4	2871
42915	Maersk Developer - Walker Ri	Mobile	26.442	-91.189	-5	
42916	Development Driller 3 - Missis	Mobile	28.731	-88.363	-209.6	3884
42917	Discoverer Inspiration - Keathl	Mobile	26.237	-92.377	-110.6	2684

Depth_Upp	Lower_dep	Sample_rat	Operator	Operator U	Data URL	
-51	803.1	10	Shell Interr	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-79.5	847.3	10	Shell Interr	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-53.1	885.1	10	Shell Interr	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-51.1	995.2	30	Shell Interr	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-60.1	812	10	Shell Interr	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-1.5	0		ConocoPhil		http://ndbc.noaa.gov/station_page.php?stati	
-61.8	1315.8	20	BP Inc	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
10	0		BP Inc	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-70.6	870.5	20	Kerr-McGe	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-134.6	614.5	20	Williams	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-126.4	929.3		Kerr-McGe	http://ww\	http://ndbc.noaa.gov/station_pag	Irregular sa
-77.2	685.2	20	BHP Billitor	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-78.7	750.7	20	Chevron	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-96.5	864.4	20	Chevron	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-63.1	1007.1	10	Shell Interr	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-63.1	1086.9	10	Shell Interr	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-43	779.1		Newfield E	http://ww\	http://ndbc.noaa.gov/station_pag	Irregular sa
-34.1	722.4	20	Petrobras -	http://ww\	http://ndbc.noaa.gov/station_pag	Data looks
-77.9	1165.9	10	BP Inc	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-43.1	922.9	20	Marathon (	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-79.4	1167.4	10	ENI Petrole		http://ndbc.noaa.gov/station_page.php?stati	
-63.3	1087.2	10	Anadarko F	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-72.9	1001	10	BP Inc	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-117.3	627.3	20	Murphy Ex	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-15.2	15.2	20	Murphy Ex	http://ww\	http://ndbc.noaa.gov/station_pag	Currents at
-73.1	1017.1	20	BHP Billitor	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-79.8	751.9	20	Anadarko F	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-79.3	815.3	10	Anadarko F	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-63.1	911		Shell Interr	http://ww\	http://ndbc.noaa.gov/station_pag	Irregular sa
-79.4	623.3	10	Marathon (	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-54.7	0		Noble Ener	http://ww\	http://ndbc.noaa.gov/station_pag	Temperatu
-43.1	875.1	20	Statoll Hydro		http://ndbc.noaa.gov/station_page.php?stati	
-1.5	0		Maersk Dri		http://ndbc.noaa.gov/station_pag	Temperatu
-63.9	1183.8	10	BP Inc	http://ww\	http://ndbc.noaa.gov/station_page.php?stati	
-33.7	818.1	15	Chevron	http://ww\	http://ndbc.noaa.gov/station_pag	Big depth b

on 42361
on 42362
on 42363
on 42364
on 42365
on 42368
on 42370
on 42375
on 42377
on 42380
mpling rate
on 42383
on 42385
on 42386
on 42390
on 42862
mpling rate
bad - big bins?
on 42868
on 42878
on 42881
on 42886
on 42887
on 42889
a single depth
on 42897
on 42904
on 42909
mpling rate
on 42911
re only
on 42914
re only
on 42916
ins

WMO#,Platform Name - Lease Block,Platform Type,Latitude,Longitude,Depth_Upper (ft),Depth_Lower_(ft),Depth_Upper_(m),Lower_depth (m),Sample_rate (minutes) ,Operator,Operator URL,Data URL,,,
42361,Auger - Garden Banks 426,Stationary,27.55,-92.49,-167.3,2635,-51,803.1,10,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42361,,,
42362,Brutus - Green Canyon 158,Stationary,27.8,-90.67,-260.8,2780,-79.5,847.3,10,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42362,,,
42363,Mars - Mississippi Canyon 807,Stationary,28.16,-89.22,-174.2,2904,-53.1,885.1,10,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42363,,,
42364,Ram-Powell - Viosca Knoll 936,Stationary,29.06,-88.09,-167.6,3265,-51.1,995.2,30,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42364,,,
42365,Ursa - Mississippi Canyon 809,Stationary,28.2,-89.12,-197.2,2664,-60.1,812,10,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42365,,,
42368,Magnolia - Garden Banks 783,Stationary,27.204,-92.203,-5,,-1.5,0,,ConocoPhillips, ,http://ndbc.noaa.gov/station_page.php?station=42368,,,
42370,Holstein - Green Canyon 645,Stationary,27.321,-90.536,-202.8,4317,-61.8,1315.8,20,BP Inc,http://www.bp.com,http://ndbc.noaa.gov/station_page.php?station=42370,,,
42375,Na Kika - Mississippi Canyon 474,Stationary,28.521,-88.289,32.8,,10,0,,BP Inc,http://www.bp.com,http://ndbc.noaa.gov/station_page.php?station=42375,,,
42377,Constitution - Green Canyon 680,Stationary,27.293,-90.968,-231.6,2856,-70.6,870.5,20,Kerr-McGee Oil and Gas Corporation,http://www.kerr-mcgee.com,http://ndbc.noaa.gov/station_page.php?station=42377,,,
42380,Devil's Tower - Mississippi Canyon 773,Stationary,28.209,-88.738,-441.6,2016,-134.6,614.5,20,Williams,http://www.williams.com,http://ndbc.noaa.gov/station_page.php?station=42380,,,
42382,Gunnison - Garden Banks 668,Mobile,27.304,-93.538,-414.7,3049,-126.4,929.3,,Kerr-McGee Oil and Gas Corporation,http://www.kerr-mcgee.com,http://ndbc.noaa.gov/station_page.php?station=42382,,,Irregular sampling rate
42383,Neptune - Green Canyon 613,Stationary,27.37,-89.924,-253.3,2248,-77.2,685.2,20,BHP Billiton,http://www.bhpbilliton.com,http://ndbc.noaa.gov/station_page.php?station=42383,,,
42385,Blind Faith - Mississippi Canyon 696,Stationary,28.34,-88.266,-258.2,2463,-78.7,750.7,20,Chevron,http://www.chevron.com,http://ndbc.noaa.gov/station_page.php?station=42385,,,
42386,Tahiti - Green Canyon 641,Stationary,27.326,-90.714,-316.6,2836,-96.5,864.4,20,Chevron,http://www.chevron.com,http://ndbc.noaa.gov/station_page.php?station=42386,,,
42390,Perdido Host - Alaminos Canyon 857,Stationary,26.129,-94.898,-207,3304,-63.1,1007.1,10,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42390,,,
42862,Jim Thompson - Mississippi Canyon 984,Mobile,28.004,-89.166,-207,3566,-63.1,1086.9,10,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42862,,,
42863,Ocean Victory - Garden Banks 425,Mobile,27.573,-92.518,-141.1,2556,-43,779.1,,Newfield Exploration Company,http://www.newfld.com,http://ndbc.noaa.gov/station_page.php?station=42863,,,Irregular sampling rate
42867,DeepSeas - Walker Ridge 469,Mobile,26.52,-90.531,-111.9,2370,-34.1,722.4,20,Petrobras - USA,http://www.petrobras.com,http://ndbc.noaa.gov/station_page.php?station=42867,,,Data looks bad - big bins?
42868,Discoverer Enterprise - Mississippi Canyon 778,Mobile,28.225,-88.502,-255.6,3825,-77.9,1165.9,10,BP Inc,http://www.bp.com,http://ndbc.noaa.gov/station_page.php?station=42868 ,,,
42878,Paul Romano - Green Canyon 244,Mobile,27.726,-90.73,-141.4,3028,-43.1,922.9,20,Marathon Oil,http://www.marathon.com,http://ndbc.noaa.gov/station_page.php?station=42878,,,
42881,Transocean Marianas - Atwater Valley 428,Mobile,27.554,-88.361,-260.5,3830,-79.4,1167.4,10,ENI Petroleum, ,http://ndbc.noaa.gov/station_page.php?station=42881,,,
42886,Discoverer Spirit - Atwater Valley 37,Mobile,27.957,-88.155,-207.7,3567,-63.3,1087.2,10,Anadarko Petroleum Corporation,http://www.anadarko.com,http://ndbc.noaa.gov/station_page.php?station=42886 ,,,
42887,Thunder Horse - Mississippi Canyon 778,Stationary,28.191,-88.496,-239.2,3284,-72.9,1001,10,BP Inc,http://www.bp.com,http://ndbc.noaa.gov/station_page.php?station=42887,,,
42889,Medusa - Mississippi Canyon 582,Mobile,28.394,-89.465,-384.8,2058,-117.3,627.3,20,Murphy Exploration & Production Company,http://www.murphyoilcorp.com,http://ndbc.noaa.gov/station_page.php?station=42889,,,

42890,Front Runner - Green Canyon 338,Mobile,27.625,-90.441,-49.9,49.9,-15.2,15.2,20,Murphy Exploration & Production Company,http://www.murphyoilcorp.com,http://ndbc.noaa.gov/station_page.php?station=42890,,,Currents at a single depth
42897,Development Driller 1 - Green Canyon 817,Mobile,27.161,-90.715,-239.8,3337,-73.1,1017.1,20,BHP Billiton,http://www.bhpbilliton.com,http://ndbc.noaa.gov/station_page.php?station=42897,,,
42904,Independence Hub - Mississippi Canyon 920,Mobile,28.085,-87.986,-261.8,2467,-79.8,751.9,20,Anadarko Petroleum Corporation,http://www.anadarko.com,http://ndbc.noaa.gov/station_page.php?station=42904,,,
42909,ENSCO 8500 - Green Canyon 903,Mobile,27.084,-90.794,-260.2,2675,-79.3,815.3,10,Anadarko Petroleum Corporation,http://www.anadarko.com,http://ndbc.noaa.gov/station_page.php?station=42909,,,
42910,Frontier Driller - Green Canyon 248,Mobile,27.73,-90.57,-207,2989,-63.1,911,,Shell International E&P,http://www.shell.com,http://ndbc.noaa.gov/station_page.php?station=42910,,,Irregular sampling rate
42911,Ocean Monarch - Green Canyon 511,Mobile,27.454,-90.619,-260.5,2045,-79.4,623.3,10,Marathon Oil,http://www.marathon.com,http://ndbc.noaa.gov/station_page.php?station=42911,,,
42913,ENSCO 8501 - Mississippi Canyon 519,Mobile,28.469,-88.251,-179.5,,-54.7,0,,Noble Energy Inc,http://www.nobleenergyinc.com,http://ndbc.noaa.gov/station_page.php?station=42913,,,Temperature only
42914,Discoverer Americas - Mississippi Canyon 540,Mobile,28.43,-89.389,-141.4,2871,-43.1,875.1,20,Statoll Hydro,,http://ndbc.noaa.gov/station_page.php?station=42914,,,
42915,Maersk Developer - Walker Ridge 543,Mobile,26.442,-91.189,-5,,-1.5,0,,Maersk Drilling USA, ,http://ndbc.noaa.gov/station_page.php?station=42915,,,Temperature only
42916,Development Driller 3 - Mississippi Canyon 252,Mobile,28.731,-88.363,-209.6,3884,-63.9,1183.8,10,BP Inc,http://www.bp.com,http://ndbc.noaa.gov/station_page.php?station=42916,,,
42917,Discoverer Inspiration - Keathley Canyon 736,Mobile,26.237,-92.377,-110.6,2684,-33.7,818.1,15,Chevron,http://www.chevron.com,http://ndbc.noaa.gov/station_page.php?station=42917,,,Big depth bins

gom-benthic-currents.csv

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32

gom-benthic-currents

Auger - Garden Banks 426

WMO_ = 42361
Platform_Name___Lease_Block = Auger - Garden Banks 426
Platform_Type = Stationary
Latitude = 27.55
Longitude = -92.49
Depth_Upper__ft_ = -167.3
Depth_Lower__ft_ = 2635
Depth_Upper__m_ = -51
Lower_depth__m_ = 803.1
Sample_rate__minutes__ = 10
Operator = Shell International E&P
Operator_URL = http://www.shell.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42361

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normal

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normal

-92.49000000000001,27.55000000000003,0

42361

Auger - Garden Banks 426

Stationary

27.55

-92.49

-167.3

2635

-51

803.1

10

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42361

Brutus - Green Canyon 158

WMO_ = 42362
Platform_Name___Lease_Block = Brutus - Green Canyon 158
Platform_Type = Stationary
Latitude = 27.8
Longitude = -90.67
Depth_Upper__ft_ = -260.8
Depth_Lower__ft_ = 2780
Depth_Upper__m_ = -79.5
Lower_depth__m_ = 847.3
Sample_rate__minutes__ = 10
Operator = Shell International E&P
Operator_URL = http://www.shell.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42362

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normal

-90.66999999999999,27.80000000000003,0

42362

Brutus - Green Canyon 158

Stationary

27.8

-90.67

-260.8

2780

-79.5

847.3

10

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42362

Mars - Mississippi Canyon 807

WMO_ = 42363
Platform_Name___Lease_Block = Mars - Mississippi Canyon 807
Platform_Type = Stationary
Latitude = 28.16
Longitude = -89.22
Depth_Upper__ft_ = -174.2
Depth_Lower__ft_ = 2904
Depth_Upper__m_ = -53.1
Lower_depth__m_ = 885.1
Sample_rate__minutes__ = 10
Operator = Shell International E&P
Operator_URL = http://www.shell.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42363

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normal

-89.22,28.15999999999999,0

42363

Mars - Mississippi Canyon 807

Stationary

28.16

-89.22

-174.2

2904

-53.1

885.1

10

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42363

Ram-Powell - Viosca Knoll 936

WMO_ = 42364
Platform_Name___Lease_Block = Ram-Powell - Viosca Knoll 936
Platform_Type = Stationary
Latitude = 29.06
Longitude = -88.09
Depth_Upper__ft_ = -167.6
Depth_Lower__ft_ = 3265
Depth_Upper__m_ = -51.1
Lower_depth__m_ = 995.2
Sample_rate__minutes__ = 30
Operator = Shell International E&P
Operator_URL = http://www.shell.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42364

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normal

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normal

-88.09,29.06000000000001,0

42364

Ram-Powell - Viosca Knoll 936

Stationary

29.06

-88.09

-167.6

3265

-51.1

995.2

30

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42364

Ursa - Mississippi Canyon 809

WMO_ = 42365
Platform_Name___Lease_Block = Ursa - Mississippi Canyon 809
Platform_Type = Stationary
Latitude = 28.2
Longitude = -89.12
Depth_Upper__ft_ = -197.2
Depth_Lower__ft_ = 2664
Depth_Upper__m_ = -60.1
Lower_depth__m_ = 812
Sample_rate__minutes__ = 10
Operator = Shell International

E&P
Operator_URL = http://www.shell.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42365

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normal

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normal

-89.12000000000001,28.19999999999997,0

42365

Ursa - Mississippi Canyon 809

Stationary

28.2

-89.12

-197.2

2664

-60.1

812

10

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42365

Magnolia - Garden Banks 783

WMO_ = 42368
Platform_Name___Lease_Block = Magnolia - Garden Banks 783
Platform_Type = Stationary
Latitude = 27.204
Longitude = -92.203
Depth_Upper__ft_ = -5
Depth_Lower__ft_ = -1.5
Depth_Upper__m_ = 0
Lower_depth__m_ = ConocoPhillips
Operator = http://ndbc.noaa.gov/station_page.php?station=42368

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normal

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normal

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normal

-92.203,27.204,0

42368

Magnolia - Garden Banks 783

Stationary

27.204

-92.203

-5

-1.5

0

ConocoPhillips

http://ndbc.noaa.gov/station_page.php?station=42368

Holstein - Green Canyon 645

WMO_ = 42370
Platform_Name___Lease_Block = Holstein - Green Canyon 645
Platform_Type = Stationary
Latitude = 27.321
Longitude = -90.536
Depth_Upper__ft_ = -202.8
Depth_Lower__ft_ = 4317
Depth_Upper__m_ = -61.8
Lower_depth__m_ = 1315.8
Sample_rate__minutes__ = 20
Operator = BP Inc
Operator_URL = http://www.bp.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42370

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normal

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normal

-90.536,27.32100000000001,0

42370

Holstein - Green Canyon 645

Stationary

27.321

-90.536

-202.8

4317

-61.8

1315.8

20

BP Inc

http://www.bp.com

http://ndbc.noaa.gov/station_page.php?station=42370

Na Kika - Mississippi Canyon 474

WMO_ = 42375
Platform_Name___Lease_Block = Na Kika - Mississippi Canyon 474
Platform_Type = Stationary
Latitude = 28.521
Longitude = -88.289
Depth_Upper__ft_ = 32.8
Depth_Lower__ft_ = 10
Depth_Upper__m_ = 0
Lower_depth__m_ = BP Inc
Sample_rate__minutes__ = http://www.bp.com
Operator = http://ndbc.noaa.gov/station_page.php?station=42375

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com/mapfiles/kml/pal4/icon49.png

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normal

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normal

-88.289,28.521,0

42375

Na Kika - Mississippi Canyon 474

Stationary

28.521

-88.289

32.8

10

0

BP Inc

http://www.bp.com

http://ndbc.noaa.gov/station_page.php?station=42375

Constitution - Green Canyon 680

WMO_ = 42377
Platform_Name___Lease_Block = Constitution - Green Canyon 680
Platform_Type = Stationary
Latitude = 27.293
Longitude = -90.968
Depth_Upper__ft_ = -231.6
Depth_Lower__ft_ = 2856
Depth_Upper__m_ = -70.6
Lower_depth__m_ = 870.5
Sample_rate__minutes__ = 20
Operator = Kerr-McGee Oil and Gas Corporation
Operator_URL = http://www.kerr-mcgee.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42377

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normal

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normal

-90.968,27.29300000000002,0

42377

Constitution - Green Canyon 680

Stationary

27.293

-90.968

-231.6

2856

-70.6

870.5

20

Kerr-McGee Oil and Gas Corporation

http://www.kerr-mcgee.com

http://ndbc.noaa.gov/station_page.php?station=42377

Devil's Tower - Mississippi Canyon 773

WMO_ = 42380
Platform_Name___Lease_Block = Devil's Tower - Mississippi Canyon 773
Platform_Type = Stationary
Latitude = 28.209
Longitude = -88.738
Depth_Upper__ft_ = -441.6
Depth_Lower__ft_ = 2016
Depth_Upper__m_ = -134.6
Lower_depth__m_ = 614.5
Sample_rate__minutes__ = 20
Operator = Williams
Operator_URL = http://www.williams.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42380

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normal

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normal

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normal

-88.738,28.20899999999999,0

42380

Devil's Tower - Mississippi Canyon 773

Stationary

28.209

-88.738

-441.6

2016

-134.6

614.5

20

Williams

http://www.williams.com

http://ndbc.noaa.gov/station_page.php?station=42380

Gunnison - Garden Banks 668

WMO_ = 42382
Platform_Name___Lease_Block = Gunnison - Garden Banks 668
Platform_Type = Mobile
Latitude = 27.304
Longitude = -93.538
Depth_Upper__ft_ = -414.7
Depth_Lower__ft_ = 3049
Depth_Upper__m_ = -126.4
Lower_depth__m_ = 929.3
Sample_rate__minutes__ = Kerr-McGee Oil and Gas Corporation
Operator = http://www.kerr-mcgee.com
Operator_URL = http://ndbc.noaa.gov/station_page.php?station=42382
Data_URL = Irregular sampling rate

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normal

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normal

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normal

-93.538,27.30400000000002,0

42382

Gunnison - Garden Banks 668

Mobile

27.304

-93.538

-414.7

3049

-126.4

929.3

Kerr-McGee Oil and Gas Corporation

http://www.kerr-mcgee.com

http://ndbc.noaa.gov/station_page.php?station=42382

Irregular sampling rate

Neptune - Green Canyon 613

WMO_ = 42383
Platform_Name___Lease_Block = Neptune - Green Canyon 613
Platform_Type = Stationary
Latitude = 27.37
Longitude = -89.924
Depth_Upper__ft_ = -253.3
Depth_Lower__ft_ = 2248
Depth_Upper__m_ = -77.2
Lower_depth__m_ = 685.2
Sample_rate__minutes__ = 20
Operator = BHP Billiton
Operator_URL = http://www.bhpbilliton.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42383

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normal

ff00aa00

normal

-89.92400000000001,27.37000000000001,0

42383

Neptune - Green Canyon 613

Stationary

27.37

-89.924

-253.3

2248

-77.2

685.2

20

BHP Billiton

http://www.bhpbilliton.com

http://ndbc.noaa.gov/station_page.php?station=42383

Blind Faith - Mississippi Canyon 696

WMO_ = 42385
Platform_Name___Lease_Block = Blind Faith - Mississippi Canyon 696
Platform_Type = Stationary
Latitude = 28.34
Longitude = -88.266
Depth_Upper__ft_ = -258.2
Depth_Lower__ft_ = 2463
Depth_Upper__m_ = -78.7
Lower_depth__m_ = 750.7
Sample_rate__minutes__ = 20
Operator = Chevron
Operator_URL = http://www.chevron.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42385

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normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-88.26600000000001,28.34000000000001,0

42385

Blind Faith - Mississippi Canyon 696

Stationary

28.34

-88.266

-258.2

2463

-78.7

750.7

20

Chevron

http://www.chevron.com

http://ndbc.noaa.gov/station_page.php?station=42385

Tahiti - Green Canyon 641

WMO_ = 42386
Platform_Name___Lease_Block = Tahiti - Green Canyon 641
Platform_Type = Stationary
Latitude = 27.326
Longitude = -90.714
Depth_Upper__ft_ = -316.6
Depth_Lower__ft_ = 2836
Depth_Upper__m_ = -96.5
Lower_depth__m_ = 864.4
Sample_rate__minutes__ = 20
Operator = Chevron
Operator_URL = http://www.chevron.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42386

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http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

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normal

ff00aa00

normal

-90.714,27.326,0

42386

Tahiti - Green Canyon 641

Stationary

27.326

-90.714

-316.6

2836

-96.5

864.4

20

Chevron

http://www.chevron.com

http://ndbc.noaa.gov/station_page.php?station=42386

Perdido Host - Alaminos Canyon 857

WMO_ = 42390
Platform_Name___Lease_Block = Perdido Host - Alaminos Canyon 857
Platform_Type = Stationary
Latitude = 26.129
Longitude = -94.898
Depth_Upper__ft_ = -207
Depth_Lower__ft_ = 3304
Depth_Upper__m_ = -63.1
Lower_depth__m_ = 1007.1
Sample_rate__minutes__ = 10
Operator = Shell International E&P
Operator_URL = http://www.shell.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42390

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-94.898,26.12899999999999,0

42390

Perdido Host - Alaminos Canyon 857

Stationary

26.129

-94.898

-207

3304

-63.1

1007.1

10

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42390

Jim Thompson - Mississippi Canyon 984

WMO_ = 42862
Platform_Name___Lease_Block = Jim Thompson - Mississippi Canyon 984
Platform_Type = Mobile
Latitude = 28.004
Longitude = -89.166
Depth_Upper__ft_ = -207
Depth_Lower__ft_ = 3566
Depth_Upper__m_ = -63.1
Lower_depth__m_ = 1086.9
Sample_rate__minutes__ = 10
Operator = Shell International E&P
Operator_URL = http://www.shell.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42862

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-89.166,28.00400000000001,0

42862

Jim Thompson - Mississippi Canyon 984

Mobile

28.004

-89.166

-207

3566

-63.1

1086.9

10

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42862

Ocean Victory - Garden Banks 425

WMO_ = 42863
Platform_Name___Lease_Block = Ocean Victory - Garden Banks 425
Platform_Type = Mobile
Latitude = 27.573
Longitude = -92.518
Depth_Upper__ft_ = -141.1
Depth_Lower__ft_ = 2556
Depth_Upper__m_ = -43
Lower_depth__m_ = 779.1
Sample_rate__minutes__ = Newfield Exploration Company
Operator = http://www.newfld.com
Operator_URL = http://ndbc.noaa.gov/station_page.php?station=42863
Data_URL = Irregular sampling rate

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-92.51799999999999,27.57300000000002,0

42863

Ocean Victory - Garden Banks 425

Mobile

27.573

-92.518

-141.1

2556

-43

779.1

Newfield Exploration Company

http://www.newfld.com

http://ndbc.noaa.gov/station_page.php?station=42863

Irregular sampling rate

DeepSeas - Walker Ridge 469

WMO_ = 42867
Platform_Name___Lease_Block = DeepSeas - Walker Ridge 469
Platform_Type = Mobile
Latitude = 26.52
Longitude = -90.531
Depth_Upper__ft_ = -111.9
Depth_Lower__ft_ = 2370
Depth_Upper__m_ = -34.1
Lower_depth__m_ = 722.4
Sample_rate__minutes__ = 20
Operator = Petrobras - USA
Operator_URL = http://www.petrobras.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42867

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-90.53100000000001,26.52,0

42867

DeepSeas - Walker Ridge 469

Mobile

26.52

-90.531

-111.9

2370

-34.1

722.4

20

Petrobras - USA

http://www.petrobras.com

http://ndbc.noaa.gov/station_page.php?station=42867

Discoverer Enterprise - Mississippi Canyon 778

WMO_ = 42868
Platform_Name___Lease_Block = Discoverer Enterprise - Mississippi Canyon 778
Platform_Type = Mobile
Latitude = 28.225
Longitude = -88.502
Depth_Upper__ft_ = -255.6
Depth_Lower__ft_ = 3825
Depth_Upper__m_ = -77.9
Lower_depth__m_ = 1165.9
Sample_rate__minutes__ = 10
Operator = BP Inc
Operator_URL = http://www.bp.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42868

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-88.502,28.22499999999998,0

42868

Discoverer Enterprise - Mississippi Canyon 778

Mobile

28.225

-88.502

-255.6

3825

-77.9

1165.9

10

BP Inc

http://www.bp.com

http://ndbc.noaa.gov/station_page.php?station=42868

Paul Romano - Green Canyon 244

WMO_ = 42878
Platform_Name___Lease_Block = Paul Romano - Green Canyon 244
Platform_Type = Mobile
Latitude = 27.726
Longitude = -90.73
Depth_Upper__ft_ = -141.4
Depth_Lower__ft_ = 3028
Depth_Upper__m_ = -43.1
Lower_depth__m_ = 922.9
Sample_rate__minutes__ = 20
Operator = Marathon Oil
Operator_URL = http://www.marathon.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42878

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-90.73,27.72599999999999,0

42878

Paul Romano - Green Canyon 244

Mobile

27.726

-90.73

-141.4

3028

-43.1

922.9

20

Marathon Oil

http://www.marathon.com

http://ndbc.noaa.gov/station_page.php?station=42878

Transocean Marianas - Atwater Valley 428

WMO_ = 42881
Platform_Name___Lease_Block = Transocean Marianas - Atwater Valley 428
Platform_Type = Mobile
Latitude = 27.554
Longitude = -88.361
Depth_Upper__ft_ = -260.5
Depth_Lower__ft_ = 3830
Depth_Upper__m_ = -79.4
Lower_depth__m_ = 1167.4
Sample_rate__minutes__ = 10
Operator = ENI Petroleum
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42881

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-88.36100000000002,27.55400000000002,0

42881

Transocean Marianas - Atwater Valley 428

Mobile

27.554

-88.361

-260.5

3830

-79.4

1167.4

10

ENI Petroleum

http://ndbc.noaa.gov/station_page.php?station=42881

Discoverer Spirit - Atwater Valley 37

WMO_ = 42886
Platform_Name___Lease_Block = Discoverer Spirit - Atwater Valley 37
Platform_Type = Mobile
Latitude = 27.957
Longitude = -88.155
Depth_Upper__ft_ = -207.7
Depth_Lower__ft_ = 3567
Depth_Upper__m_ = -63.3
Lower_depth__m_ = 1087.2
Sample_rate__minutes__ = 10
Operator = Anadarko Petroleum Corporation
Operator_URL = http://www.anadarko.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42886

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-88.155,27.95699999999998,0

42886

Discoverer Spirit - Atwater Valley 37

Mobile

27.957

-88.155

-207.7

3567

-63.3

1087.2

10

Anadarko Petroleum Corporation

http://www.anadarko.com

http://ndbc.noaa.gov/station_page.php?station=42886

Thunder Horse - Mississippi Canyon 778

WMO_ = 42887
Platform_Name___Lease_Block = Thunder Horse - Mississippi Canyon 778
Platform_Type = Stationary
Latitude = 28.191
Longitude = -88.496
Depth_Upper__ft_ = -239.2
Depth_Lower__ft_ = 3284
Depth_Upper__m_ = -72.9
Lower_depth__m_ = 1001
Sample_rate__minutes__ = 10
Operator = BP Inc
Operator_URL = http://www.bp.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42887

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-88.496,28.19099999999999,0

42887

Thunder Horse - Mississippi Canyon 778

Stationary

28.191

-88.496

-239.2

3284

-72.9

1001

10

BP Inc

http://www.bp.com

http://ndbc.noaa.gov/station_page.php?station=42887

Medusa - Mississippi Canyon 582

WMO_ = 42889
Platform_Name___Lease_Block = Medusa - Mississippi Canyon 582
Platform_Type = Mobile
Latitude = 28.394
Longitude = -89.465
Depth_Upper__ft_ = -384.8
Depth_Lower__ft_ = 2058
Depth_Upper__m_ = -117.3
Lower_depth__m_ = 627.3
Sample_rate__minutes__ = 20
Operator = Murphy Exploration & Production Company
Operator_URL = http://www.murphyoilcorp.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42889

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-89.46500000000002,28.39400000000001,0

42889

Medusa - Mississippi Canyon 582

Mobile

28.394

-89.465

-384.8

2058

-117.3

627.3

20

Murphy Exploration & Production Company

http://www.murphyoilcorp.com

http://ndbc.noaa.gov/station_page.php?station=42889

Front Runner - Green Canyon 338

WMO_ = 42890
Platform_Name___Lease_Block = Front Runner - Green Canyon 338
Platform_Type = Mobile
Latitude = 27.625
Longitude = -90.441
Depth_Upper__ft_ = -49.9
Depth_Lower__ft_ = 49.9
Depth_Upper__m_ = -15.2
Lower_depth__m_ = 15.2
Sample_rate__minutes__ = 20
Operator = Murphy Exploration & Production Company
Operator_URL = http://www.murphyoilcorp.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42890

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-90.44100000000002,27.625,0

42890

Front Runner - Green Canyon 338

Mobile

27.625

-90.441

-49.9

49.9

-15.2

15.2

20

Murphy Exploration & Production Company

http://www.murphyoilcorp.com

http://ndbc.noaa.gov/station_page.php?station=42890

Development Driller 1 - Green Canyon 817

WMO_ = 42897
Platform_Name___Lease_Block = Development Driller 1 - Green Canyon 817
Platform_Type = Mobile
Latitude = 27.161
Longitude = -90.715
Depth_Upper__ft_ = -239.8
Depth_Lower__ft_ = 3337
Depth_Upper__m_ = -73.1
Lower_depth__m_ = 1017.1
Sample_rate__minutes__ = 20
Operator = BHP Billiton
Operator_URL = http://www.bhpbilliton.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42897

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-90.715,27.161,0

42897

Development Driller 1 - Green Canyon 817

Mobile

27.161

-90.715

-239.8

3337

-73.1

1017.1

20

BHP Billiton

http://www.bhpbilliton.com

http://ndbc.noaa.gov/station_page.php?station=42897

Independence Hub - Mississippi Canyon 920

WMO_ = 42904
Platform_Name___Lease_Block = Independence Hub - Mississippi Canyon 920
Platform_Type = Mobile
Latitude = 28.085
Longitude = -87.986
Depth_Upper__ft_ = -261.8
Depth_Lower__ft_ = 2467
Depth_Upper__m_ = -79.8
Lower_depth__m_ = 751.9
Sample_rate__minutes__ = 20
Operator = Anadarko Petroleum Corporation
Operator_URL = http://www.anadarko.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42904

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-87.98599999999999,28.08500000000002,0

42904

Independence Hub - Mississippi Canyon 920

Mobile

28.085

-87.986

-261.8

2467

-79.8

751.9

20

Anadarko Petroleum Corporation

http://www.anadarko.com

http://ndbc.noaa.gov/station_page.php?station=42904

ENSCO 8500 - Green Canyon 903

WMO_ = 42909
Platform_Name___Lease_Block = ENSCO 8500 - Green Canyon 903
Platform_Type = Mobile
Latitude = 27.084
Longitude = -90.794
Depth_Upper__ft_ = -260.2
Depth_Lower__ft_ = 2675
Depth_Upper__m_ = -79.3
Lower_depth__m_ = 815.3
Sample_rate__minutes__ = 10
Operator = Anadarko Petroleum Corporation
Operator_URL = http://www.anadarko.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42909

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-90.79400000000001,27.08400000000001,0

42909

ENSCO 8500 - Green Canyon 903

Mobile

27.084

-90.794

-260.2

2675

-79.3

815.3

10

Anadarko Petroleum Corporation

http://www.anadarko.com

http://ndbc.noaa.gov/station_page.php?station=42909

Frontier Driller - Green Canyon 248

WMO_ = 42910
Platform_Name___Lease_Block = Frontier Driller - Green Canyon 248
Platform_Type = Mobile
Latitude = 27.73
Longitude = -90.57
Depth_Upper__ft_ = -207
Depth_Lower__ft_ = 2989
Depth_Upper__m_ = -63.1
Lower_depth__m_ = 911
Sample_rate__minutes__ = Shell International E&P
Operator

= http://www.shell.com
Operator_URL = http://ndbc.noaa.gov/station_page.php?station=42910
Data_URL = Irregular sampling rate

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-90.56999999999999,27.72999999999997,0

42910

Frontier Driller - Green Canyon 248

Mobile

27.73

-90.57

-207

2989

-63.1

911

Shell International E&P

http://www.shell.com

http://ndbc.noaa.gov/station_page.php?station=42910

Irregular sampling rate

Ocean Monarch - Green Canyon 511

WMO_ = 42911
Platform_Name___Lease_Block = Ocean Monarch - Green Canyon 511
Platform_Type = Mobile
Latitude = 27.454
Longitude = -90.619
Depth_Upper__ft_ = -260.5
Depth_Lower__ft_ = 2045
Depth_Upper__m_ = -79.4
Lower_depth__m_ = 623.3
Sample_rate__minutes__ = 10
Operator = Marathon Oil
Operator_URL = http://www.marathon.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42911

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-90.619,27.454,0

42911

Ocean Monarch - Green Canyon 511

Mobile

27.454

-90.619

-260.5

2045

-79.4

623.3

10

Marathon Oil

http://www.marathon.com

http://ndbc.noaa.gov/station_page.php?station=42911

ENSCO 8501 - Mississippi Canyon 519

WMO_ = 42913
Platform_Name___Lease_Block = ENSCO 8501 - Mississippi Canyon 519
Platform_Type = Mobile
Latitude = 28.469
Longitude = -88.251
Depth_Upper__ft_ = -179.5
Depth_Lower__ft_ = -54.7
Depth_Upper__m_ = 0
Lower_depth__m_ = Noble Energy Inc
Sample_rate__minutes__ = http://www.nobleenergyinc.com
Operator = http://ndbc.noaa.gov/station_page.php?station=42913
Operator_URL = Temperature only

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-88.25100000000002,28.46899999999998,0

42913

ENSCO 8501 - Mississippi Canyon 519

Mobile

28.469

-88.251

-179.5

-54.7

0

Noble Energy Inc

http://www.nobleenergyinc.com

http://ndbc.noaa.gov/station_page.php?station=42913

Temperature only

Discoverer Americas - Mississippi Canyon 540

WMO_ = 42914
Platform_Name___Lease_Block = Discoverer Americas - Mississippi Canyon 540
Platform_Type = Mobile
Latitude = 28.43
Longitude = -89.389
Depth_Upper__ft_ = -141.4
Depth_Lower__ft_ = 2871
Depth_Upper__m_ = -43.1
Lower_depth__m_ = 875.1
Sample_rate__minutes__ = 20
Operator = Statoll

Hydro
Operator_URL = http://ndbc.noaa.gov/station_page.php?station=42914

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-89.389,28.43,0

42914

Discoverer Americas - Mississippi Canyon 540

Mobile

28.43

-89.389

-141.4

2871

-43.1

875.1

20

Statoll Hydro

http://ndbc.noaa.gov/station_page.php?station=42914

Maersk Developer - Walker Ridge 543

WMO_ = 42915
Platform_Name___Lease_Block = Maersk Developer - Walker Ridge 543
Platform_Type = Mobile
Latitude = 26.442
Longitude = -91.189
Depth_Upper__ft_ = -5
Depth_Lower__ft_ = -1.5
Depth_Upper__m_ = 0
Lower_depth__m_ = Maersk Drilling USA
Operator = http://ndbc.noaa.gov/station_page.php?station=42915
Operator_URL = Temperature only

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-91.18899999999999,26.44200000000001,0

42915

Maersk Developer - Walker Ridge 543

Mobile

26.442

-91.189

-5

-1.5

0

Maersk Drilling USA

http://ndbc.noaa.gov/station_page.php?station=42915

Temperature only

Development Driller 3 - Mississippi Canyon 252

WMO_ = 42916
Platform_Name___Lease_Block = Development Driller 3 - Mississippi Canyon 252
Platform_Type = Mobile
Latitude = 28.731
Longitude = -88.363
Depth_Upper__ft_ = -209.6
Depth_Lower__ft_ = 3884
Depth_Upper__m_ = -63.9
Lower_depth__m_ = 1183.8
Sample_rate__minutes__ = 10
Operator = BP Inc
Operator_URL = http://www.bp.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42916

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-88.36300000000001,28.73100000000001,0

42916

Development Driller 3 - Mississippi Canyon 252

Mobile

28.731

-88.363

-209.6

3884

-63.9

1183.8

10

BP Inc

http://www.bp.com

http://ndbc.noaa.gov/station_page.php?station=42916

Discoverer Inspiration - Keathley Canyon 736

WMO_ = 42917
Platform_Name___Lease_Block = Discoverer Inspiration - Keathley Canyon 736
Platform_Type = Mobile
Latitude = 26.237
Longitude = -92.377
Depth_Upper__ft_ = -110.6
Depth_Lower__ft_ = 2684
Depth_Upper__m_ = -33.7
Lower_depth__m_ = 818.1
Sample_rate__minutes__ = 15
Operator = Chevron
Operator_URL = http://www.chevron.com
Data_URL = http://ndbc.noaa.gov/station_page.php?station=42917

#default+nicon=http://maps.google.com/mapfiles/kml/pal4/icon57.png+hicon=http://maps.google.

com/mapfiles/kml/pal4/icon49.png

ff00aa00

normal

http://maps.google.com/mapfiles/kml/pushpin/grn-pushpin.png

ff00aa00

normal

ff00aa00

normal

-92.37699999999998,26.23699999999998,0

42917

Discoverer Inspiration - Keathley Canyon 736

Mobile

26.237

-92.377

-110.6

2684

-33.7

818.1

15

Chevron

http://www.chevron.com

http://ndbc.noaa.gov/station_page.php?station=42917

Received(Date): Tue, 11 May 2010 17:56:24 -0500
From: Andrew David <andy.david@noaa.gov>
To: David Mcclellan <David.Mcclellan@noaa.gov>
Subject: Re: [Fwd: [Fwd: Fw: Oil and RVC]]

I was at sea until last night, sorry for the delay.

For safety stops, the recommendation is 3 min at 15 fsw for any single dive >60 fsw or any repet dives >40 fsw. Deep intermediate stop is at your discretion.

For oil, avoid any dives if the divers have to swim through a visible sheen on the surface. A tar ball here and there is not grounds for stopping operations.

Let me know if this answers your questions fully. AWD

David Mcclellan wrote:
> Andy,
> I have sent your email regarding "Oil Spill Diving" to the PI's for
> the Dry Tortugas cruise aboard the MV Spree this summer, May 13-23 and
> June 9-19. We have been ordered to write "oil or no oil" on our data
> sheets (see below). Please give me a better definition of when I
> should suspend diving, if this is necessary. Would this be an oil
> sheen, presence of tar balls, or actual floating oil. I can hear the
> arguments already.
> Dave Mc
>
> ---
>
> Subject:
> [Fwd: Fw: Oil and RVC]
> From:
> "Jerald S. Ault" <jault@rsmas.miami.edu>
> Date:
> Sat, 08 May 2010 13:40:20 -0400 (EDT)
> To:
> steve.smith@rsmas.miami.edu, Jim.Bohnsack@noaa.gov,
> David.Mcclellan@noaa.gov
>
> To:
> steve.smith@rsmas.miami.edu, Jim.Bohnsack@noaa.gov,
> David.Mcclellan@noaa.gov
>
>
> FYI
>
> ----- Original Message -----
> From: David Hallac
> Sent: 05/08/2010 10:59 AM EDT
> To: Matt Patterson
> Subject: Re: Oil and RVC
>
>
>
> Thanks, Jerry - the RVC at DRTO is serving as a baseline condition
> assessment as part of the NPS pre-oil condition assessment plan.
> We'll be in touch soon.

>
>
> ----- Original Message -----
> From: Matt Patterson
> Sent: 05/08/2010 10:46 AM EDT
> To: "Jerald S. Ault" <jault@rsmas.miami.edu>
> Cc: David Hallac
> Subject: Re: Oil and RVC
>
>
>
> We hope so as well, but we really need it on the data sheets in the
> comments with "oil" or "no oil" as a record for potential litigation.
>
> Matt
>
>
> ----- Original Message -----
> From: "Jerald S. Ault" [jault@rsmas.miami.edu]
> Sent: 05/08/2010 10:29 AM AST
> To: Matt Patterson
> Cc: "Jerald S. Ault" <jault@rsmas.miami.edu>; David Hallac
> Subject: Re: Oil and RVC
>
>
>
> Matt, We will absolutely let you know ... hopefully the observations will
> be zero! Jer
>
>
>> Jer, can you please insist that all fish counters add in the comments for
>> all sites "oil" or "no oil" observed during the dive, pretty please.
>>
>> Matt
>>
>>
>> ----- Original Message -----
>> From: "Jerald S. Ault" [jault@rsmas.miami.edu]
>> Sent: 04/26/2010 02:43 PM AST
>> To: randall.kosaki@noaa.gov; Dan Kimball; Mark Lewis;
>> billy.causey@noaa.gov; jim.bohnsack@noaa.gov; sean.morton@noaa.gov;
>> mark.robson@myfwc.com; jennifer.koss@noaa.gov;
>> bob.g.ballard@dep.state.fl.us; kacky.andrews@noaa.gov;
>> jennifer.schull@noaa.gov; mark.monaco@noaa.gov; robert.brock@noaa.gov;
>> richard.appeldoorn@upr.edu; samuel.pooley@noaa.gov; gregg.waugh@safmc.net;
>> steve.bortone@gulfcouncil.org; Matt Patterson;
>> chantal.collier@dep.state.fl.us; jamie.monty@dep.state.fl.us;
>> luiz.barbieri@myfwc.com; gil.mcrae@myfwc.com
>> Cc: todd.kellison@noaa.gov; steve.smith@rsmas.miami.edu;
>> nzurcher@rsmas.miami.edu
>> Subject: May 4th - Coral Reef Fish-Habitat Modeling Workshop
>>
>>
>>
>> Colleagues,
>>
>> Attached is a draft agenda for next weekÃ‚Â's Ã‚Â‘Coral Reef Fish-Habitat
>> Modeling to Support Fisheries and Ecosystem ManagementÃ‚Â' workshop.

>>
>> Date: May 4, 2010
>> Location: Library Map & Chart Room, UM Rosenstiel School
>> Time: 0830-1600
>>
>> FYI, the University of Miami has a special arrangement with the following
>> hotel:
>>
>> Courtyard by Marriott
>> Miami-Coconut Grove
>> 2649 S. Bayshore Drive
>> Miami, FL 33133
>> 1-888-249-3819
>> Corporate Code: University of Miami
>> $92.00 Standard
>>
>> We are looking forward to seeing you soon.
>>
>> Jerry Ault
>> Steve Smith
>> Todd Kellison
>>
>
> **********
> Jerald S. Ault, Ph.D.
> Professor of Marine Biology and Fisheries
> Rosenstiel School of Marine and Atmospheric Science
> University of Miami, 4600 Rickenbacker Causeway
> Miami, FL 33149 jault@rsmas.miami.edu
> (305)421-4884 ph (305)421-4791 fax
> http://femar.rsmas.miami.edu/
> http://bonefishresearch.com/
> http://tarponresearch.com/
> **********
>
>

--
Andrew W. David

Research Fishery Biologist
Line Office Diving Officer (LODO), NOAA Fisheries

NOAA Fisheries
Panama City Laboratory
3500 Delwood Beach Road
Panama City, FL 32408
[Tel] (850) 234-6541 ext 208
[Fax] (850) 235-3559
[Cell] (850) 819-4067
[E-Mail] andy.david@noaa.gov

Received(Date): Sat, 15 May 2010 11:20:22 -0400
From: "Hogarth, Bill" <billhogarth@usf.edu>
Subject: FW: Fwd: Re: [Fwd: Available Underwater Vehicles]
To: 'Steve Murawski' <Steve.Murawski@noaa.gov>,'"Nancy.Thompson@noaa.gov"' <Nancy.Thompson@noaa.gov>,Roy Crabtree <Roy.Crabtree@noaa.gov>, 'John Oliver' <John.Oliver@noaa.gov>
Signed_NRDA_Water_Sampling[1].pdf

Just trying to kep you in loop

Bill Hogarth
Dean, College of Marine Science
University of South Florida
140 Seventh Avenue South, KRC3109
St. Petersburg, FL 33701
Phone: 727-553-3542
Fax: 727-553-3968
email: billhogarth@usf.edu

-----Original Message-----
From: Kovach, Charles [mailto:Charles.Kovach@dep.state.fl.us]
Sent: Saturday, May 15, 2010 10:07 AM
To: Hu, Chuanmin; Lembke, Chad
Cc: Hogarth, Bill; Albert C. Hine; Weisberg, Bob; Patten, James; Peebles, Ernst; gkirkpat@mote.org
Subject: RE: Fwd: Re: [Fwd: Available Underwater Vehicles]

Suspect some of you may have this already, but just in case see the attached:

" Field Plan for Water-Column Profiling to Measure Dissolved-Phase Aromatic Hydrocarbons and Free Oil Droplets as a Function of Depth and Location Relative to the Subsurface Oil Release May 3, 2010 (Revised May 5, 2010) Prepared by: James R. Payne, Ph.D. (PECI, for NOAA) Reviewed by W. Barry Gillespie, Jr., Ph.D. (ENTRIX, for BP)"

Charles Kovach
Senior Scientist
FDEP SW District
Environmental Unit Lead
USCG Sector St. Pete

813-363-1456

The Department of Environmental Protection values your feedback as a customer. DEP Secretary Michael W. Sole is committed to continuously assessing and improving the level and quality of services provided to you. Please take a few minutes to comment on the quality of service you received. Copy the url below to a web browser to complete the DEP survey: http://survey.dep.state.fl.us/?refemail=Charles.Kovach@dep.state.fl.us Thank you in advance for completing the survey.

From: Chuanmin Hu [mailto:hu@marine.usf.edu]
Sent: Saturday, May 15, 2010 9:40
To: Chad Lembke
Cc: Bill Hogarth; Albert C. Hine; Bob Weisberg; Jim Patten; Kovach, CharlesSubject: Re: Fwd: Re: [Fwd: Available Underwater Vehicles]

Chad:
I am copying Charles Kovach here who is FL DEP chief scientist in our region responsible for monitoring this event. Charles is organizing a cruise next week to the central WFS near the LC to measure the pre-conditions.

It would be great if MOTE could focus a little bit southward while we cover the northern part, so both institutions collectively have a better coverage. On the ability of Eco-Triplets to detect oil - although I am conservative I agree that we may be able to catch some anomaly signals so we can use ancillary information (circulation models, in situ and remote optical signals, infrared imagery, etc.) as well as fast-response cruise to tease out the signals.
Chuanmin

On Sat, 15 May 2010, Chad Lembke wrote:

> All,
> fyi, Mote will be doing some deployments w/in the next couple weeks.
> I think our gliders and the Triplet puck are useful as well,
> especially if we can compliment their deployments. Since their
> transect is so close to ours, I've inquired as to whether it might be
> better if they went further south, or alternatively we could wait
> until their transects are done and then do ours after.
> Chad
>
> -------- Original Message --------
> Subject: Re: [Fwd: Available Underwater Vehicles]
> Date: Fri, 14 May 2010 16:39:12 -0400
> From: Gary Kirkpatrick <gkirkpat@mote.org>
> To: Chad Lembke <clembke@marine.usf.edu>
> CC: Alan <ahails@mote.org>, Cory <cory@mote.org>, Bob <rdc@mote.org>
>
> Chad:
>
> Yes, we are going to deploy three gliders over the next two weeks with
> CDOM payloads. Those payloads are purported to be able to detect
> crude oil, PAHs and the dispersant (document attached). We are going
> to try to cover the shelf off of Manatee and Sarasota with two of
> them. The third one we are going to send down to our lab in the Keys
> and get them to launch it north of the Keys to patrol for oil in that
> area. I have attached our tentative transect map. It is a very
> ambitious plan, but we will do as much of it as possible. It would be
> awesome if you could have some out too. Do you have CDOM payloads?
> WetLabs is doing a fast build to have some on the shelf very soon (if not already).
>
> Of course the modelers are anxious for the CTD data, but I am sure you
> know that. It seems as though the more we can get for them the better
> our knowledge will be of where the oil is going to show up.
>
> I have been keeping CDR Buch informed of our status in case it is
> decided there are more pressing missions, but so far there does not
> seem to be any 'plans'. So we plan to go forward with our plan until
> asked to do otherwise.
>
> Let us know if it looks like we can have a glider party on the shelf.
>
> Gary
>
> Chad Lembke wrote:

> > Gary, thanks much. I'll send Eric and email.
> > all's good round here. busy-ish.
> > Are you guys planning on any deployments in the gulf near term? We
> > just finished a batch and are currently scheduled for more in the
> > June / July time frame, but we'll see if someone pushes for more.
> >
> > On 5/14/2010 10:19 AM, Gary Kirkpatrick wrote:
>> Chad:
>>
>> Received this request for information yesterday. Just occurred to
>> me that I did not see your name in the list. You may want to get
>> on the list.
>>
>> Hope all is well with you.
>>
>> Gary
>>
>> -------- Original Message --------
>> Subject: Available Underwater Vehicles
>> Date: Thu, 13 May 2010 13:06:39 -0400
>> From: Buch, CDR Eric <eric.buch@nrl.navy.mil>
>> To: Craig Lee <craig@apl.washington.edu>, "Bellingham, James"
>> <jgb@mbari.org>, "Bellingham, James" <jgb@mbari.org>, "Brown, Brian
>> B CAPT NAVOCEANO, 00" <brian.b.brown@navy.mil>, "Bernstein, Phillip
>> J CIV NSWC PC" <phillip.bernstein@navy.mil>, Gary Kirkpatrick
>> <gkirkpat@mote.org>, Jeff Smith <jsmith@BluefinRobotics.com>,
>> Joshua Elvander <jelvander@BluefinRobotics.com>, Clayton Jones
>> <cjones@webbresearch.com>, Oscar Schofield
>> <oscar@marine.rutgers.edu>, "Scott Glenn
>> (scott@marine.rutgers.edu)" <glenn@marine.rutgers.edu>, Harvey Seim <hseim@email.unc.edu>,
"Bewig, Roger CIV NAVOCEANO, N93"
>> <roger.bewig@navy.mil>, "Kent, Chris S CIV CNMOC, N32"
>> <chris.kent@navy.mil>, sam.walker <Sam.Walker@noaa.gov>
>> CC: Franchi, Dr. Edward <edward.franchi@nrl.navy.mil>, Zdenka S.
>> Willis
>> <Zdenka.S.Willis@noaa.gov>, Winokur, Robert SES OPNAV, N2\N6F5B
>> <robert.s.winokur@navy.mil>, <taltshuler@teledyne.com>
>>
>>
>>
>> All,
>>
>> I have been asked to attempt to consolidate all of the assets that
>> are may be available to support the Oil leak in the Gulf and break
>> out by sensor, depth, system etc. If I do not have everyone or all
>> systems and sensor please add.
>>
>>
>>
>> I have attached a spread sheet that I believe has everyone that I
>> have spoken with and a few extra. I owe a response to NOAA in 45
>> minutes, so if I could get folks to fill this out as soon as
>> possible and forward back to me that would be helpful.
>>
>>
>>
>> Thanks,
>>

> >> Hope to have some assets in the water in a coordinated fashion soon.
> >> Thanks for all the help,
> >>
> >> Eric B
> >>
> >>
> >>
> >> /CDR Eric J. Buch USN/
> >>
> >> /Military Deputy for Ocean, Atmospheric, and Space S&T (Code 7005)/
> >>
> >> /Naval Research Laboratory/
> >>
> >> /4555 Overlook Avenue SW///
> >>
> >> /Washington//, DC 20375-5349///
> >>
> >> /(w) 202-404-8162 DSN: (312) 754-8162/
> >>
> >> /eric.buch@nrl.navy.mil <mailto:eric.buch@nrl.navy.mil> (UNCLAS)/
> >>
> >>
> >>
> >>
> >>
> >>
> >>> >
>
> --
> Gary J. Kirkpatrick, Ph.D.
> Senior Scientist
> Mote Marine Laboratory
> 1600 Ken Thompson Parkway
> Sarasota, Florida 34236
> Phone: (941) 388-4441, ext 271
> FAX: (941) 388-4312
> e-mail: gkirkpat@mote.org
>
>
>

Field Plan for Water-Column Profiling to Measure Dissolved-Phase Aromatic Hydrocarbons and Free Oil Droplets as a Function of Depth and Location Relative to the Subsurface Oil Release

May 3, 2010 (Revised May 5, 2010)

Prepared by: James R. Payne, Ph.D. (PECI, for NOAA)

Reviewed by W. Barry Gillespie, Jr., Ph.D. (ENTRIX, for BP)

Objectives

1. Use data collected during this cruise to calibrate 3-dimensional modeling of subsurface oil plume structure, fate (dissolution behavior), and transport, by:

 a. Measuring discrete, free-oil droplet concentrations at multiple depths 2 Km up-current from the release site and at three locations (2, 4, and 8 km) down-current, or further as needed to collect water samples beyond the apparent leading edge of the plume based on updated and most accurate information at the time of sampling), and

 b. Measuring dissolved phase (BTEX and water-soluble lower-molecular-weight PAH (naphthalenes and phenanthrenes/anthracenes) at the same stations (nominally 2 Km up-current and 2, 4, and 8 Km down-current).

2. In subsequent cruise(s), use the same approach to obtain data on the effects of *in situ* dispersant injection on water quality and exposure issues. If possible, this effort will be combined with the proposed sampling associated with response monitoring undertaken for the testing of dispersant injected at depth.

Approach

1. All operations will be completed from a CSA International, Inc. (a Continental Shelf Associates company) chartered 180 ft vessel capable of working in the oiled zone (all personnel PB Safety or HAZWOPER trained). The vessel is capable of dynamic positioning and will remain in the area overnight to facilitate operations (reducing transit time from port), but due to safety and cost considerations, sampling operations will not be undertaken after dark.

2. Vessels will not operate closer than approximately 2 km of the release site, and a BP industrial hygienist will be present to ensure that OHSA-permitted exposures to benzene and other volatile hydrocarbons will not be exceeded. If levels are observed to spike above regulated levels, sampling operations will be safely terminated and the vessel will be repositioned further from the release point before sampling is resumed.

Document ID: 0.7.45.5087.1

3. Upon arrival at the station locations up-current of the release site, a series of continuous Conductivity-Temperature-Depth (CTD) casts will be completed to determine the water column structure (vertical profile) for selection of water-sampling depths.[1]

4. Water samples will be collected at four depths (near bottom, just below the thermocline, mid mixed-layer (between thermocline and surface), and just below water surface, (a total of 4 samples at 4 stations 16 total)[2] using:

 a. A remotely operated vehicle (ROV) for collecting the near-bottom samples with a 4-5 L Go Flow Bottle and

 b. A conventional hydrowire with six 5 L Go Flow Bottles and pressure controlled trip mechanisms (certified to 0.05% of specified sampling depth) to collect water samples just below the surface, in the middle of the upper mixed layer, and just below the thermocline (see separate QA Plan for NRDA Chemistry Cruise).

 c. Split or duplicate samples will be collected on 50% of the samples (VOAs (x2), dissolved-phase, and filtered oil) as specified in the QA Plan for NRDA Chemistry Cruise. These will be transferred to Entirx/BP under full chain-of-custody at the conclusion of the sampling effort. With these duplicates the total number of samples will be 24 plus associated trip, field, and equipment blanks as specified in Table 1 and the QA Plan.

 d. As available, occasional grab samples of surface oil/mousse will be collected with a jar or bucket from the sampling vessel. This will assess surface oil weathering behavior as a function of distance from the release point.

5. Immediately after sample retrieval a Portable Large Volume Water Sampling System (PLVWSS) (Payne et al., 1999; see separate PLVWSS Sampling Protocol and Water Sample Handling Procedures) will be employed on the research vessel to separate the particulate/oil phase trapped on 0.7 µm glass fiber filter and capture the dissolved phase (filtrate) in 3.8 L (1 gal) I-Chem Certified Clean amber glass jugs.

[1] If available, a series of telemetry-equipped Acoustic Doppler Current Profilers (ADCPs) will be deployed 24 hours before the cruise to provide near-real time data on currents in the area to further guide sample station selection and positioning.

[2] It would be ideal if we could increase sampling frequency in known biologically active layers where impacts to plankton, turtles, fish, and mammals might be. If time and supplies permit, this will be attempted by increasing sampling intensity in the upper 40 feet of water or an appropriate depth based on previous data sets. This will be facilitated by an *in situ* fluorometer (with telemetry back to the sampling vessel) placed on the hydrowire just below the Go Flow Bottle.

6. The PLVWSS requires ~3.5 L of sample (for enhanced detection limits above the usual 1 L sample size, see Water Sample Handling Procedures), so before filter processing the bulk of the sample, duplicate 40 mL aliquots will be drained from the Go Flow bottle directly into VOA vials for analysis of BTEX and other alkylated benzenes. Then, after the majority of the rest of the sample is processed through the PLVWSS, the remaining 4-500 mL will be saved unfiltered for microscopic (or other) enumeration of droplet sizes and number density.

7. Maintaining complete Chain-of-Custody, freeze the filter containing the finite oil droplets and refrigerate the water sample on the research vessel.

8. Upon returning to port, transfer the NRDA samples under complete chain-of-custody to Alpha Analytical Laboratories in Mansfield, MA and the BP/Entirx duplicate/splits to B&B Laboratories [or if needed, to another lab similarly selected by the trustees and the responsible party (BP represented by ENTRIX)] for analyses of alkylated PAH by Selected Ion Monitoring and Volatile Organic Analytes (VOA) by purge and trap GC/MS.

Vessel:

All operations will be completed on the *M/V Green Provider* (180 ft) operated by Coastal Marine Logistics out of Golden Meadow, LA (see attached document for . This vessel has been chartered by CSA International, Inc. The ROV is a Super Mohawk 10,000 fsw rated ROV with twin manipulators, and a tether management system. It is based in Morgan City, LA and is available at this time.

The cruise is planned for Thursday and Friday (May 6 and 7, 2010).

Safety Plan:

A separate operations and safety plan has been prepared for review and approval before any planned operations.

Estimated Total Costs for Equipment and Ship time:

M/V Green Provider ~$24K per day (assuming 12 hr/day operations)

ROV ~$14K per day (assuming 12 hr/day operations)

The sampling activities are currently planned for daylight operations only. Additional boat personnel (crew and captain/pilot) would be required for 24 hr/day operations and this would increase the daily costs by ~$4-5K. ROV operation costs would also significantly increase for 24 hr/day operations. We will remain on station at night, but sampling activities will be curtailed with only a skeleton crew manning the vessel for safety.

Reference: Payne, J.R., T.J. Reilly, and D.P. French, “Fabrication of a Portable Large-volume Water Sampling System to Support Oil Spill NRDA Efforts,” in *Proceedings of the 1999 Oil Spill Conference*, American Petroleum Institute, Washington, D.C., pp. 1179-1184, 1999.

Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment. Parties each reserve its right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan.

Approved by:

Lisa DiPinto, Ph.D. (NOAA)

5/10/10
Date

Ralph Markarian, Ph.D. (ENTRIX)

5/10/10
Date

Attachments:

1. Portable Large-Volume Seawater Sampling System (PLVWSS): PLVWSS Specifications, Sampling Protocols, and Power Requirements 05/05/10
2. Water Sampling Protocols in Support of the NRDA Cruise, 05/05/10
3. Data Quality Assurance (QA) Plan for NRDA Water Column Chemistry Cruise, 05/05/10

Table 1. Sample numbers and totals by station.

		Station 1		Station 2		Station 3		Station 4	
		VOA	THC/PAH	VOA	THC/PAH	VOA	THC/PAH	VOA	THC/PAH
Surface	NRDA	2	1	2	1	2	1	2	1
	Entrix Rep			2	1			2	1
	DI Blank	2	1			2	1	2	1
	Seawater Background			2	1	2	1	2	1
Mixed Layer	NRDA	2	1	2	1	2	1	2	1
	Entrix Dupe/Split	2	1			2	1		
	DI Blank								
	Seawater Background								
Mid Depth	NRDA	2	1	2	1	2	1	2	1
	Entrix Dupe/Split							2	1
	DI Blank								
	Seawater Background					2	1		
Deep	NRDA	2	1	2	1	2	1	2	1
	Entrix Dupe/Split	2	1			2	1	2	1
	DI Blank					2	1	2	1
	Seawater Background							2	1

					Total
NRDA Samples	4	4	4	4	16
BP/Entrix Samples	2	1	2	3	8
DI Water Blank Samples	1	0	2	2	5
Seawater Background Samples	0	1	2	2	5

Document ID: 0.7.45.5087.1

PORTABLE LARGE-VOLUME SEAWATER SAMPLING SYSTEM (PLVWSS)

05/05/10

PLVWSS Specifications, Sampling Protocols, and Power Requirements

Container	Contents	Dimensions (inches)	Weight (lbs)	Power Requirements
Cruise Box No.1	Vacuum pump, in line charcoal filter and water trap, vacuum gauge, support rack for 1 gallon amber glass bottles, Teflon® stopper and suction tubing	24¼ W x 21¾ D x 19½ H	60	110 volts AC (from ship's AC outlet or portable generator)
Cruise Box No. 2	14.2 cm stainless steel Millipore® filter holder, Tygon® tubing, Teflon® solvent squirt bottles for equipment rinsing, Pall Gelman Sciences 14.2 cm glass fiber filters, electrical extension cord, stainless steel forceps and spatula for filter manipulation	23¾ W x 23 ¾ D x 21¼ H	50	None

INSTRUCTIONS FOR SAMPLE COLLECTION AND FILTRATION

1) Place the Tygon® sampling tubing attached to the upper side of the filtration unit into the water (for near-surface samples if direct suction sampling is desired) or attach to the sampling port of the Go Flow Bottle used to collect samples at depth.

2) Plug in the vacuum pump (there is no on/off switch), and hold the Teflon® stopper firmly in the neck of the sample bottle. DO NOT FORCE THE STOPPER COMPLETELY INTO THE BOTTLE. The Viton® O-ring on the stopper is intended to make the seal with the upper lip of the sample bottle. Forcing the stopper into the neck of the bottle may cause the bottle to break, and it will certainly make it difficult to remove the stopper at the termination of sampling operations.

3) Press the Viton® O-ring on the stopper onto the top lip of the amber-glass bottle until a vacuum reading of 20 to 24 inches of Hg is obtained on the vacuum gauge attached to the pump. If the stopper starts to get sucked into the sample bottle, gently pull it out part way while still maintaining 20 to 24 inches of vacuum. Hold the stopper in place until water can be observed bubbling about 3 to 4 inches from the top of the amber glass bottle. This entire process may take from 5 to 7 minutes.

4) At this point, carefully watch the upper water level to ensure that the bottle does not become completely filled. Also, watch the vacuum tubing running from the Teflon® stopper to the in-line charcoal filter and water trap to see signs of water droplets starting to be drawn across into the trap. Stop collecting the sample when the water level is about 2 to 3 inches from the top of the 1-gallon bottle or when frequent water droplets are observed going over into the in-line trap.

5) To stop sampling, simply pull up on the Teflon® stopper to break the vacuum seal with the sample bottle. DO NOT TURN OFF THE VACUUM PUMP FIRST. This can damage the vacuum pump, and cause back diffusion of materials trapped in the in-line water trap back into the sample.

6) After the seal with the sample bottle is broken and the vacuum pressure has dropped back to ambient, unplug the vacuum pump.

7) Disconnect the Teflon® stopper from the transfer tubing coming from the bottom of the Millipore® filtration unit and wrap both ends of the tubes from the two-holed Teflon® stopper with aluminum foil. Place the original cap from the amber-glass bottle back on the bottle to seal it. Leave the sample in the pump box for safe storage until all other sampling operations are secure.

8) Drain any excess water from the tube running from the bottom of the filtration unit before opening the Millipore® filter housing. This will prevent any of the filtered material (SPM, sand, and free oil droplets) from being washed off the filter when the unit is opened. After all the water has drained from the bottom of the filtration unit, cap the tubing with aluminum foil and wrap the tubing around the legs for temporary storage.

9) Open the Millipore® filtration unit and carefully remove the outer ¼-inch circle of the glass-fiber filter from the perforated blue support base. Discard the outer edge of the filter. Using the stainless steel forceps and spatula provided with the PLVWSS, carefully fold the filter (while still on the blue support base) in half (and then in half again) to make a quarter-pie shape and then one more time making an eighth of a pie wedge. This entire operation should be done with the filter still resting on the perforated blue support base.

10) Place the folded filter wedge into a 125 mL Certified-Clean I-Chem bottle, seal and label it. The filters may be stored on ice or frozen in the field, if dry ice is available. Store frozen.

11) If another water sample is to be collected right away, place another glass-fiber filter into the Millipore® filtration unit, return the filtration unit to the cruise box/container, and proceed to the next station.

Finally, put the filtered water sample in the 1-gallor amber glass jug in a refrigerator (4^{o}C) or cooler with frozen Blue Ice packs for storage before transfer to the analytical laboratory. Alternatively, the dissolved-phase water sample may be preserved by acidification (pH < 2 with HCl) or poisoned with 50 to 100 mL of methylene chloride. Because of air-freight shipping considerations, preservation with refrigeration and shipment with Blue Ice is preferred, particularly if next-day air delivery to the laboratory is available.

Contact James R. Payne at PECI for questions or additional information
jrpayne@sbcglobal.net (760) 942 1015; cell 760 613 7391

Document ID: 0.7.45.5087.1

5/5/2010

Water Sampling Protocols in Support of the NRDA Cruise WATER SAMPLES

Sampling Objectives

- To determine the concentration of oil compounds in the water column.
- To determine the source via fingerprinting, the degree of weathering, and background levels.
- To document exposure of water-column organisms and validate toxicity models.
- To maintain the integrity the sample(s) during sampling, transport, and storage.

Sample Volume

Analysis	*Sample Volume*	*Reporting Limit*
Volatile Aromatic Hydrocarbons (VAH)* by SIM GC/MS (collect in duplicate)	40 mL vials	0.1-1 µg/L (ppb)
Total Hydrocarbon (THC) by GC/FID	1-Liter	15 µg/L (ppb)
PAH (including alkylated PAHs) by SIM GC/MS	1-Liter	0.001 to 0.01 µg/L
	3.5 Liter	0.0005 to 0.003 µg/L

*sometimes referred to as VOA or BTEX analysis

Sampling Equipment/Containers

See separate NRDA Cruise Plan and PLVWSS procedures for use of the Portable Large Volume Water Sampling System (PLVWSS) for separating dissolved- and particulate/oil fractions by vacuum filtration immediately after collection.

- Collect VAH samples (wearing clean Nitrile gloves) by pouring directly from the collection device (4 or 5 L Go-Flow bottle or other sampler) into HCl-persevered 40 mL septum-capped vials. Ensure that there is no headspace (i.e., bubble) in the vial.
- Collect water samples for THC and PAH in glass containers, certified-clean to be organic-free (solvent rinsed). Amber glass is preferred. Leave headspace of about 1 inch for 1 L jars. If the Portable Large Volume Water Sampling System (PLVWSS) is used, the sample will first be processed by vacuum filtration through a 0.7 µm glass fiber filter as it is vacuum transferred from the Go Flow Bottle into the amber glass jug (see separate PLVWSS Protocol).
- If slicks are present, decon samplers before each use (see separate QA Plan for the NRDA Cruise). Wash with laboratory-grade detergent and clean water, with a triple clean-water rinse (distilled water from a local store is OK but laboratory grade, certified-clean DI water is better. If that cannon be obtained, clean "background" water from an up-current non-contaminated area may be used. If sampler is contaminate by an oil slick, an Alkanox wash followed by solvent rinse with isopropanol (or acetone) and methylene chloride is appropriate. (See separate QA Plan for sampler decon and blank protocol/frequency.) Collect waste solvent rinsate for proper disposal.

Sample Collection Methods

- Collect subsurface samples below the water surface so as not to include any surface oil.
- Take "near surface" samples from approximately 1 m below the surface; take "near bottom" samples within 5 m of the bottom.

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- Sampling equipment MUST be deployed and retrieved in the closed position. Also applies to sample jars lowered by hand.
- On each cruise, try to sample the control/least oiled areas first, then more contaminated zones.
- Clear surface slicks with a boat hook or pole prior to deploying the equipment, but carefully so that the surface oil is not physically dispersed into the water column. Sweeping the area with sorbents may also be effective.

Preservation/Holding Times

- VAH (VOA vial): With no preservative the samples may be held for 7 days at 4°C in the dark. Addition of HCl can extend the holding time to 14 days at 4°C in the dark without loss of sample integrity.
- THC and PAH: No preservative added. Can be held at 4°C in the dark for up to 7 days.
- Immediately place all water samples in cooler and keep at 4° C (do not freeze).
- Use packing material around containers to prevent breakage.
- Ship to the laboratory ASAP with complete COCs. They need at least one day to process prior to holding time expiration.
- **Volatile hydrocarbons** (benzene, toluene, ethylbenzene, and xylene, or BTEX). For oil spill applications, the standard EPA Method 8240 (purge & trap) should be modified by running the GC/MS in selected ion monitoring mode and expanding the scan list (retention times and ions) to include the higher alkylated (C3 and C4) benzenes. Detection limits should be 1 ppb for individual analytes; 0.1 ppb is possible.
- **Total hydrocarbons** (THC). Often referred to as total petroleum hydrocarbons, but most methods do not differentiate among petroleum, petrogenic, and biogenic hydrocarbons. THC by GC-FID (total area of FID gas chromatogram of combined f_1 and f_2 fractions after column chromatography) is often the preferred method because of the low detection limit (compared to other THC methods) and the direct measurement of individual hydrocarbons. This method does not detect low boiling compounds (below n-C_8). For NRDA, THC analyses generally will not provide the data needed to support calculation of toxic effects from PAH exposure, and will have to be corrected to equivalent PAHs. The THC results, however, can be used to tract oil weathering and map extent of exposure of water column resources, if meaningful detection limits can be reached. So, get a copy of the GC "trace." Detection limits are usually higher than those needed for aquatic injury assessment.
- **Polycyclic aromatic hydrocarbons** (PAH). Since most of the toxicity in oil is due to the PAHs, it is often the preferred analysis for NRDA. However, PAHs are expensive and require special laboratory skills. If PAHs are to be measured, it is important that the analytes include the alkyl-substituted PAH homologs, in addition to the standard PAH "priority pollutants." This method is referred to as Modified EPA Method 8270, because the list of PAHs is expanded to include the alkylated homologs, using GC/MS in the selected ion monitoring (SIM) mode. Detection levels should be 1 ppb for individual PAHs to support injury assessment using toxicity thresholds. Have the lab also run the source oil.

Other Considerations

- Contamination by surface slicks is of great concern. Document presence of slicks, weather, wave conditions, etc. which might suggest mixing of surface oil during sampling.

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- Be aware of sources of contamination on the sampling vessel (exhaust fumes, engine cooling systems, oily surfaces). Work up-wind of any exhausts. Segregate dirty/clean areas. Lay out clean substrates to work on and replace frequently.
- Collect background samples from clean sites representative of pre-oiling conditions, as well as areas not yet oiled but in the potential path of the oil.
- Preservation chemicals should be provided by the lab.
- Use a computer or conceptual model of the extent of water-column contamination to determine the number and location of samples. Minimum guidelines are at least three samples per area of relatively uniform exposure or sub-waterbody. Also, sample along exposure gradients starting in the cleanest zone at regular intervals proportionate to the exposure area.

Contact James R. Payne at PECI for questions or additional information

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Data Quality Assurance Plan for NRDA Water Column Chemistry Cruise

Purpose

This document provides general guidance for field sampling data quality assurance for the collection of NRDA field samples for planned sampling cruise on May 6 and May 7, 2010 to assist in the validation of 3-dimensional modeling of subsurface plume structure aboard the M/V Green Provider,

The current sampling plan involves sampling 4 depths at 4 stations for BTEX, THC, PAHs and free oil droplet size. Sampling requirements as outlined for basic sampling to address field program objectives for adequate description of locations are presented in Table 1. This sampling scheme is derived from the Field Plan and Sampling Protocol documents.

Table 1: Required Analytical Samples for 3-dimensional modeling data support

Sample Type	Volume Needed	**Minimum** # of samples per location
BTEX	40 mL	2 per depth
THC and PAH	1 gallon	1
Oil Droplet distribution	10 mL	10 per sample depth

In addition to basic site description, additional sampling requirements for data verification and validation, as well as equipment and procedural validation are required. These samples and the suggested frequency are described below.

Laboratory Notebook

All errata and observations that do not have a logical spot on the Chain of Custody form shall be documented in a bound lab notebook with numbered pages. Additional notation shall be written in black or blue ink. Entry errors shall be crossed out with a single line, initialed, and dated.

Blank Samples

Laboratory Grade de-ionized (DI) water in certified clean glass containers will be provided by Pace Laboratories. 5 DI water samples shall be collected, where practical, using the laboratory provided water, according to the described methodology for BTEX and THC/PAH analyses (including filtration) at each sample location. These samples shall be handled and stored in accordance with the accepted methodology for each sample type. At stations where two DI samples are collected, one shall be collected before Go-Flo bottle sample collection, and one shall be collected after the last seawater sample is collected.

Guided by fluorescence measurements from the upwind site (which is presumed to be representative of seawater not impacted by oil) the depth of minimum fluorescence will be used for the collection of a volume of background seawater. This seawater will be stored in sealed amber glass jars. Background sample blank collection shall be done in the same manner as outlined for DI sample blanks above.

Storage Procedure Monitoring
Aqueous samples shall be refrigerated to 4 °C (+/- 0.5 °C). DO NOT FREEZE. Refrigeration temperature shall be recorded when samples are stored, and periodically monitored and recorded to ensure proper refrigeration. A thermometer will be available to remain with the aqueous samples in storage for monitoring purposes.

Filter samples shall be frozen for storage. Storage temperature shall be kept at 0 °C or below. Refrigeration temperature shall be recorded when samples are stored, and periodically monitored and recorded to ensure proper refrigeration. A thermometer will be available to remain with the filter samples in storage for monitoring purposes.

Methods for sample replicates/splits
To accomplish sample splits, two methods can be employed during the cruise. Method One will be simultaneous deployment of two 5 L Go-Flo bottles which will be closed at the same depth in order to collect sample water as similar as practical. Method Two involves deploying a single 10 L Go-Flo bottle and collecting samples in series from the same bottle upon retrieval. Method One will be the preferred method. Method choice must be documented on the Chain of Custody form as **Replicate** (Method One) or **Split** (Method Two).

Sampling Equipment Monitoring
All tubing and shall be visually inspected before sampling. Sampling tubing shall be changed when contamination is visually obvious. Tubing changes shall be documented in a separate laboratory notebook (date, time, location).

Sample Depth Determination and Verification
Where practical, sample depths shall be chosen to best elucidate modeling data needs. For all samples except ROV collected samples (where depth is distance from the bottom (is fixed by the tethering equipment apparatus), depths must be preset and the depth selections recorded. Verification of triggering sequence of the CTD shall be made and documented in order to verify samples were collected as expected. Go-Flo bottles shall be numbered and numbers documented with sample station and on Chain of Custody forms. Any malfunction of the triggering of the Go-Flo bottle operation shall be documented.

General Sampling Plan for Shipboard Execution

Plan, by station and depth, to ensure the acquisition of sufficient samples, replicates, DI blanks, and seawater blanks.

Station 1 is designated as the collection point for additional background seawater samples. A 10 L Go-Flo bottle shall be used to collect seawater which will be stored in the refrigerator between uses. Additional seawater shall be collected after rosette deployment as needed.

Table 2: Sampling Schedule for NRDA Cruise May 2010

		Station 1		Station 2		Station 3		Station 4	
		VOA	THC/PAH	VOA	THC/PAH	VOA	THC/PAH	VOA	THC/PAH
Surface	NRDA	2	1	2	1	2	1	2	1
	Entrix Rep			2	1			2	1
	DI Blank	2	1			2	1	2	1
	Seawater Background			2	1	2	1	2	1
Mixed Layer	NRDA	2	1	2	1	2	1	2	1
	Entrix Dupe/Split	2	1			2	1		
	DI Blank								
	Seawater Background								
Mid Depth	NRDA	2	1	2	1	2	1	2	1
	Entrix Dupe/Split							2	1
	DI Blank								
	Seawater Background					2	1		
Deep	NRDA	2	1	2	1	2	1	2	1
	Entrix Dupe/Split	2	1			2	1	2	1
	DI Blank					2	1	2	1
	Seawater Background							2	1

					Total
NRDA Samples	4	4	4	4	16
BP/Entrix Samples	2	1	2	3	8
DI Water Blank Samples	1	0	2	2	5
Seawater Background Samples	0	1	2	2	5

ENTRIX	WATER COLUMN PROFILING SERVICES	CSA

Water Column Profiling Services to Measure Dissolved-Phase Aromatic Hydrocarbons and Free Oil Droplets as a Function of Depth and Location Relative to the Subsurface Oil Release

GOM BLOCK

MISSISSIPPI CANYON 252

PROJECT HSE PLAN

ENTRIX Corporation

CSA International, Inc. (CSA)

REVISION STATUS			APPROVAL		
Rev	**Date**	**Reason for Issue**	**Originator**	**Reviewed**	**Approved**
A	4-May-2010	Issued for Comment	L. Powell		

Dist:	**Subject**	**HSE Management**				
As per page 2	**Activity:**	**Project HSE Plan**				
	Location:	**GOM Block MC252**				
		Location	Disc	Document Type	Sequence No	Rev
	Doc. No.					1

PARTY APPROVAL FOR USE IN OPERATIONS

ENTRIX	CSA
~~Ryan Holem~~ RH 5/6/10 HSE Manager Stephen C. Dunham, CIH (Bureau Veritas)	Lynwood Powell HSE Manager

Record of Document Issue

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1.0 INTRODUCTION

ENTRIX has contracted CSA International, Inc. (CSA) to conduct a Water Column Profiling Survey (WCPS) to Measure Dissolved-Phase Aromatic Hydrocarbons and Free Oil Droplets as a Function of Depth and Location Relative to the Subsurface Oil Release in Mississippi Canyon Block 252 (**Figure 1**). The objective of the project is to collect data to calibrate 3-dimensional modeling of subsurface oil plume structure, fate, and transport.

CSA has chartered the M/V Green Provider as the support vessel to conduct all survey operations for this project. The survey will consist of performing water column profiles using a General Oceanics model 1018 Rosette Water Sampling system and hydrographic profiles using a Seabird SBE-19 Profiling Conductivity-Temperature-Depth (CTD). Also a Teledyne-RDI Acoustic Doppler Current Profiler (ADCP) will be mounted on an over-the-side pole and used to collect real-time water current data. In addition a Sub-Atlantic Super Mohawk ROV system will be used to collect sediment and water samples and record video at the seabed. The survey vessel will deploy all sampling equipment at predetermined locations using a-frame, davit and winch systems. Within MC Block 252, water depths are expected to be approximately 5,000ft.

This document represents CSA International, Inc. (CSA) health, safety, and environment (HSE) policies and procedures for the ENTRIX WCPS. CSA is responsible for the overall safety management of the survey program.

Marine sampling can be inherently hazardous, and proper precautions need to be taken. Precautions for general vessel safety and chemical hazards to be observed on all CSA surveys are discussed in this document. The physical hazards unique to sampling equipment and operations and sampling precautions are discussed. The Project Scientist and the Site Safety Coordinator are responsible for ensuring that CSA HSE policies and procedures are consistently followed and enforced. Sampling activities will be suspended if the safety of the work crew cannot be ensured. Due to safety considerations all operations will be conducted during daylight hours only.

Details of the field plan and sampling locations can be found in **Attachment A-Field Plan**.

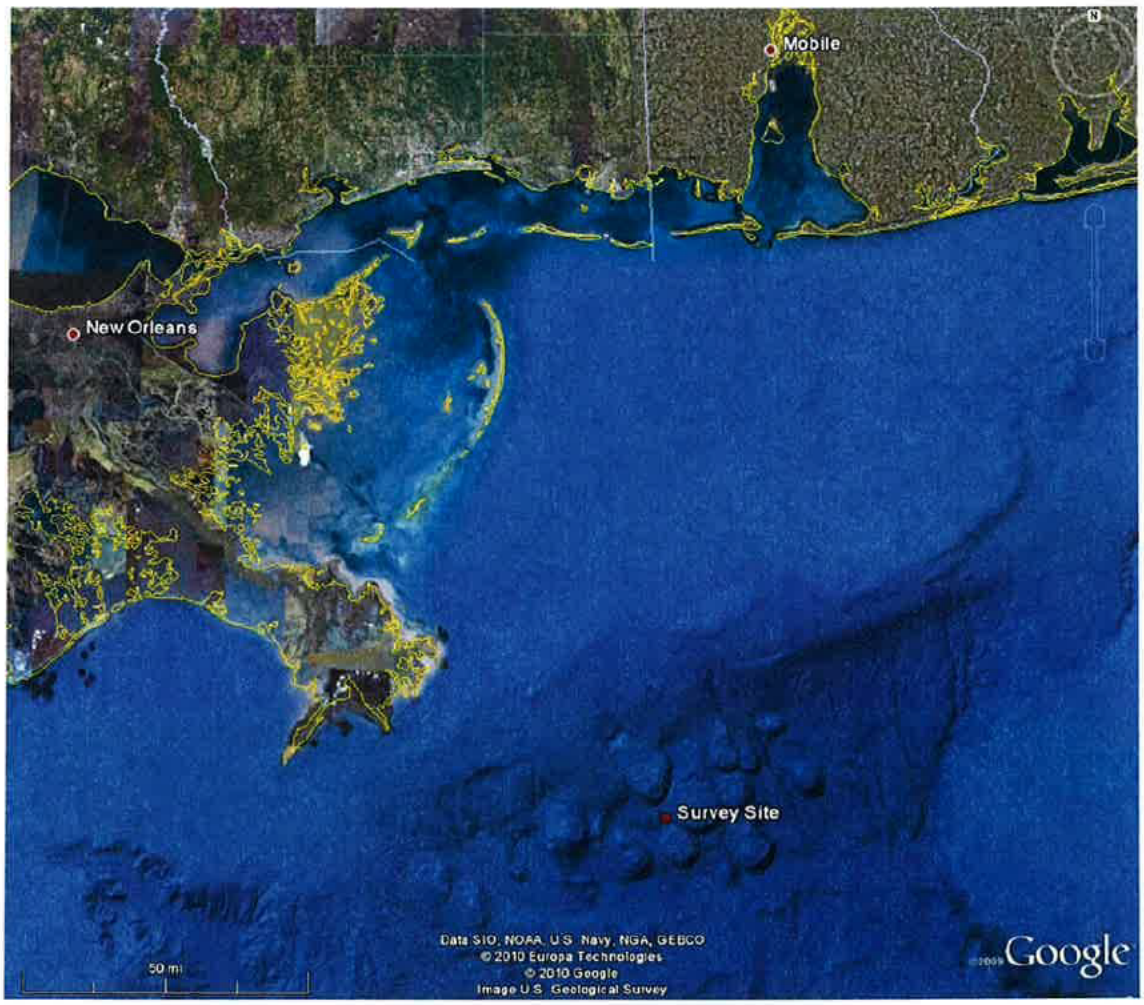


Figure 1. Location of Survey Site in Mississippi Canyon Block 252

1.1 General HSE Policy

This HSE Plan specifies the safety rules and standards for all CSA personnel and subcontractors during field onshore, shipboard, and laboratory activities. The HSE Plan is a tool to help implement and maintain the CSA safety policies and procedures.

1.1.1 CSA HSE Goals

The safety goal for CSA is to prevent all injuries, protect worker health, and cause no damage to the environment. CSA is vitally concerned for the health and safety of all its employees, subcontractors, facilities, and materials used during all phases of operations. We rely on each employee to actively support and implement the HSE policies and procedures. All CSA personnel are responsible for HSE compliance. The HSE policies are intended to create and maintain a safe working environment for all employees and protect the environment.

All employees and subcontractors are to be familiar with the client's HSE policies and work rules. In particular, all employees and subcontractors are to read from the client's corporate safety manuals all sections pertaining to:

- client sites that may be visited by CSA personnel during the conduct of CSA's work; and
- any activities which are procedurally similar to CSA's activities for the project.

PROJECT OPERATIONS WILL BE SHUT DOWN
IF SAFETY OF PERSONNEL CANNOT BE ASSURED

1.1.2 Site Safety Hazard Analysis and Risk Assessment

The Site Safety Coordinator will perform a site safety hazard/risk analysis as necessary for any special operations which might be required for this project. Safety procedures are routinely assessed for effectiveness specific to the project. The Site Safety Coordinator monitors safety procedures and evaluates them on a specific task by task basis. This information is relayed to the CSA Corporate Safety Supervisor and changes, if any, are made to further ensure personnel safety.

A project-specific Hazards Analysis/Risk Assessment is presented in **Appendix A**. **Table 1** provides the risk ranking descriptions. The HSE Risk Assessment was conducted for each potential hazard by ranking the consequence of the hazard and likelihood of the hazard occurring as summarized in **Table 2**.

Table 1. Risk ranking descriptions.

Risk Ranking	Description
A	Broadly acceptable
B	Tolerable
C	Subject to further study; identification of risk reduction measures and Cost Benefit Analysis
D	Subject to further study; identification of risk reduction measures and Cost Benefit Analysis
E	Unacceptable

Table 2. Risk matrix.

Likelihood of Occurrence		Consequence of Hazard				
		1	8	16	50	100
		Minor	Moderate	Major	Critical	Catastrophic
0.5	Insignificant	A (0.5)	A (4)	B (8)	B (25)	C (50)
1	Remote	A (1)	B (8)	B (16)	C (50)	D (100)
2	Infrequent	A (2)	B (16)	C (32)	D (100)	D (200)
5	Occasional	A (5)	C (40)	C (80)	D (250)	E (500)
10	Frequent	B (10)	C (80)	D (160)	E (500)	E (1,000)

1.1.3 Deviation from Safety Standards

Any deviation from the standard safety requirements as outlined in this HSE Plan and the client's particular Corporate Safety Manual shall be registered by the Site Safety Coordinator with the appropriate feedback from personnel. Follow-up by the Site Safety Coordinator requires reporting any deviations to the CSA Corporate Safety Supervisor.

1.1.4 Management of Change

If for any reason there is a request to make changes, the following will apply: The ENTRIX Representative will be notified of any changes to material, equipment, personnel, or procedures that could affect the safety of the operation or materially affect the scope or completion of the work.

Changes to any aspect of the work program will be subject to a risk assessment by CSA and ENTRIX to ensure any potential adverse effects of the change may be identified and either eliminated or controlled to minimize risk as much as reasonably practicable. Proposed changes will require the approval of the CSA Project Manager (or a designated representative) and the ENTRIX Technical Representative prior to implementation. Any such changes or additions to the operation and the subsequent risk assessment will be communicated prior to implementation to all relevant personnel likely to be affected by the change.

Any implemented change will be documented by completing a CSA Management of Change Order (See **Appendix C-Forms**).

2.0 LINE MANAGEMENT

2.1 Site Safety Coordinator

The Site Safety Coordinator for this project will be **Tony Wadley** and his role in the project includes the following:

- HAZWOPER/CPR/First Aid trained;
- Ensures that first aid supplies are in good order and easily accessible;
- Conducts pre-mobilization safety briefing;
- Conducts daily safety/tool box meetings at the beginning of each day and notifies the client representative if any conditions or specific health and safety hazards will be encountered during the work to be done during the day;
- Responsible for ensuring all safety rules are followed and understood;
- Understands that if unsafe conditions exist, personnel are not required to work; and
- Will not rush to complete a job at the expense of safety.

2.2 Project Scientist/QA Coordinator

The Project Scientist/QA Coordinator for this project will be **Bruce Graham** and his role in the project includes the following:

- Responsible for data collection and quality;
- First line of incident reporting;
- Coordinates daily survey progress assessment meetings;
- Responsible for reporting and recording all injuries, accidents, and near misses to the designated client representative on board and to the CSA home offices. The initial report will be oral, which will then be followed by a written record; and
- HAZWOPER/CPR/First Aid trained

2.3 Operations Director

The Operations Manager for this project will be **Frank Johnson** and his role in the project includes the following:

- Coordinates with Project Scientist on overall survey goals;
- Coordinates operations with ship's crew;
- Responsible for equipment installation and operation;
- Responsible for daily operations of sampling equipment; and
- HAZWOPER/CPR/First Aid trained.

2.4 Operations Manager

The Lead Technician for this project will be **Terry Stevens** and his role in the project includes the following:

- Insure all sampling equipment is in proper working order;
- Inspects CSA equipment daily to ensure it is in proper working order;
- Assist in sample/data collection and processing;
- Responsible for implementing safety procedures; and
- HAZWOPER/CPR/First Aid trained.

EACH EMPLOYEE IS RESPONSIBLE FOR HIS OWN AND OTHERS' SAFETY.
HE ALSO HAS AN OBLIGATION TO WORK SAFELY AND REPORT ANY UNSAFE CONDITIONS.

3.0 HAZARD COMMUNICATION

3.1 General

All employees and contract personnel are informed of all potential health and safety hazards related to the project and are instructed on how to avoid the risk of an accident. When operating offshore CSA personnel will conduct daily meetings and communicate progress with onshore support. Personnel to relay program status and any logistical concerns and requirements via SAT Phone email.

3.2 Reporting

All survey personnel will be provided with sampling guides that summarize sample collection and processing activities and identify potential hazards.

In the event of an injury accident the Site Safety Coordinator initially will notify the Project Manager and/or Project Director and the client or its agent verbally. An Incident/Accident Notification form will be completed within 24 hours of an accident/injury/near miss and a copy will be sent to the CSA HSE Manager. "Incident/Accident Notification" forms (**Appendix C**) will be kept on site.

A daily progress report will be prepared for the HSE manager and will detail the technical aspects of the sampling acquisition as well as details and will include the following:

- Close calls/near misses;
- Any unsafe condition;
- Any CSA employee having a problem working safely;
- Any accident/incident;
- Any failure of safety equipment;
- Hazard reports & safety observations;
- Inspections & audits completed;
- Emergency drills completed;
- Personnel on Board;
- HSE issues or concerns; and
- Interaction with other vessels and fishermen

3.3 Project Site

Mobilization/Demobilization: Golden Meadow, Louisiana
Survey Site: GOM Block MC252 6-7 RH 5/5/10
Schedule and Duration: Mobilization – May ~~5~~ 6 2010; 2 day survey
Weather: Monitored and assessed daily

3.3.1 General Vessel Safety

To ensure adequate preparation for emergencies that may possibly arise, prior to selecting and/or chartering a vessel for survey operations, the Site Safety Coordinator will ensure that the proper safety equipment are or will be available when the vessel is mobilized for a survey. If any equipment are not available (e.g., in foreign countries where vessels of opportunity are used) arrangements should be made to have the safety equipment made available either from in-country sources or by shipping them to the mobilization port.

3.3.2 Pre-Mobilization Safety Briefing (PMSB)

A Pre-mobilization Safety Briefing will be conducted by the CSA Site Safety Coordinator and the ENTRIX HSE Manager.

The following list is a summary of items to be discussed:
1. Description of project and goals
2. Communications – key to acquiring goals
3. Team members, assignments, and shifts
4. Coordination with ship's crew
5. Designation of person in charge on deck
6. Complexity of the operations – moving platform, machinery, openings
7. Pre-operation checks – vessel preparation
8. Safety equipment – vessel and sampling
9. Hazards - vessel and equipment – Hazid Actions/JSA/Toolbox
10. Limitations of personnel and equipment (Lifting, rigging, and safe working loads)
11. Environmental conditions (wind, weather, sea state, etc.)

An HSE induction for all personnel involved with the offshore field survey will be conducted by CSA prior to or during vessel mobilization.

All vessel crew members will be briefed on the operation of all primary sampling equipment, cranes, winches, blocks, cables, and A-frame prior to mobilization.

It is the responsibility of the Site Safety Coordinator and survey team members to ensure that proper rigging and lifting procedures are used.

The vessel's captain will be responsible for conducting the following drills: M.O.B., Fire, Abandon Ship, and Medical Emergency. These drills will be conducted once before the survey begins and weekly thereafter.

3.3.3 Chemical Hazards

Isopropyl Alcohol, Hexane, and Liquinox will be used during the field surveys. Material Safety Data Sheets (MSDS) for each chemical product will be aboard the vessel located near the chemicals and on the bridge. All personnel will be aware of the chemical products being used and safety considerations needed to prevent injuries.

The Site Safety Coordinator will ensure that field personnel review all relevant Material Safety Data Sheets (MSDS) before mobilizing for a field survey.

It is the responsibility of all personnel on board to take advantage of the information available, to wear the protective equipment provided, and to follow recommendations for handling any hazardous material.

Protective safety equipment will be worn when handling hazardous chemicals and include: chemical-resistant gloves, laboratory aprons, safety glasses or goggles, masks, and/or respirators.

In some areas, contact with marine sediment may present a potential health hazard from chemical and/or biological constituents of the sediment. Possible routes of exposure to chemical/biological hazards include inhalation, skin and/or mucous membrane absorption, ingestion, and injection. Potentially hazardous chemical/biological sediment constituents may include hydrogen sulfide, mercury and other heavy metals, polynuclear aromatic hydrocarbons, polychlorinated biphenyls, solvents, and various types

of bacteria and viruses. Other potentially hazardous substances may include chemicals used as sample preservative agents or sampler decontamination agents.

Crew members should exercise caution to avoid coming into contact with potentially contaminated sediment during sampling operations. Crew members should exercise good personal hygiene after sampling and prior to eating or drinking.

Exposure to airborne contaminants can be greatly reduced if the vessel steams to windward in a way that minimizes risk to the sampling crew from exposure to volatiles. Having respirators on hand will reduce exposure to volatile fumes that may be present when mixing large quantities of chemicals or using a solvent rinse during equipment decontamination.

During sampling, caution, common sense, and good judgment should dictate appropriate safety gear to be worn in any given situation on deck. Hardhats, gloves, and steel-toed shoes must be worn in working conditions where there is a possibility of injury to the head, hands, or feet. Work vests must be worn while working on the fantail, or while working near an open gunwale. If in doubt, survey team members should ask the designated Site Safety Coordinator.

Collecting samples in extremely hot and humid weather carries the risk of dehydration and heat stroke. Survey team members should carry an adequate supply of potable water or other liquids for protection against dehydration in hot weather. The Site Safety Coordinator will ensure that survey team members continually drink to replace lost fluids in periods of work in hot weather.

3.4 Areas of Safety Concern

3.4.1 Mobilization

There is a large variety of marine sampling equipment in use today, and each has the potential for causing serious injury. Many types are heavy, ranging from under 50 lbs for a small sediment grab or plankton net to up to 2,000 lbs for a large Ewing piston corer. Unless the equipment is secure on deck or fully deployed and submerged, care must be taken to avoid crushing or other impact-related injuries from the handling of this gear.

This project will use a large ROV to collect all chemical and infaunal samples. The ROV is very heavy and all personnel must be aware of the corer weight and potential for uncontrolled motions during deployment and recovery. Proper tag line procedures will be stressed during the pre-mobilization briefing. Work gloves will be worn at all times when using tag lines.

Also, an appreciable amount of vertical clearance is usually required to clear the gunwale during deployment and retrieval, which in turn can increase the risk of uncontrolled lateral motion unless suitable tag lines are used.

A typical box corer is fairly heavy (from 200 to 900 lbs) and is also both tall and wide at the base. At least 100 square feet of deck area is required to safely manage this equipment. Good foot protection is mandatory when handling this equipment.

Essentially all types of sediment grabs utilize their own weight, some type of tensioning device, or other form of mechanical advantage to actuate the sampler upon contact with the bottom. Care must therefore be taken to minimize the risk of accidental or premature closure while handling. The box corer for this project has a release which triggers upon contact with the bottom. The sample is collected during retrieval.

In general, all sampling equipment uses the same type of marine hardware to attach to the appropriate lifting device. Periodically, all connections (e.g., cabling, shackles, pins, swivels, etc.) should be inspected to ensure the integrity of all points along the sampling assembly. The placement of the survey equipment on the deck will be discussed with the captain to assure safety and structural concerns are addressed. Welders attaching equipment to the vessel need to be certified in the operation of the welding and cutting equipment as well as using the appropriate materials to secure the equipment to the vessel. Tag lines will be attached to all equipment when it is being placed on or removed from the vessel.

Concern: Lifting equipment onto vessel.
Precaution(s): Lift with legs, back straight, good footing, and avoid twisting. Get help if load is too heavy. Avoid pushing, pulling, or prying while working aloft. Approved hard hats and safety boots/shoes with toe protection should be worn while working on the fantail.

Concern: Slippery deck.
Precaution(s): Guard rails; shoes, boots with sufficient anti-skid soles to minimize potential for slippage; employees to wear personal floatation device (PFD) while on the work deck at sea and if transfers are required.

Concern: Installation of equipment.
Precaution(s): Secure all equipment in case of rough seas. In the case of installation of navigational antenna and cables, two people will be on hand at all times for this part of the mobilization and will inform vessel captain of antenna installation and positioning and have the radar unit switched off (antennae should not be moving).

Concern: Loose containers.
Precaution(s): Secure all shipping containers to ensure they cannot break loose and cause physical harm during rough sea condition.

Concern: Confined space.
Precaution(s): Keep clean and ventilated. Check for proper lighting. Conform to vessel permit to work and confined space entry requirements

Concern: Lock out/tag out procedures (faulty equipment).
Precaution(s): Unplug equipment before doing repair and tag it as such. Reactivate the system only through an established and published procedure that ensures each person has removed his own lock and tag first.

Concern: Installation of first aid kit.
Precaution(s): Ensure all personnel are aware of the location of the first aid kit on the vessel.

Concern: Location of fire extinguishers.
Precaution(s): Ensure all personnel are aware of the location of the fire extinguishers on the vessel.

3.4.2 Offshore

A sampling device is least secure while suspended in the air during the transitional period between the deck of a vessel and the surface of the water; a pitching and/or rolling deck during rough weather will aggravate this situation. Care must be taken to ensure that sufficient restraining, or tag lines or other devices are in place to meet these conditions. Because of the increased potential for damage or injury, all personnel on deck and in the wheelhouse must be notified before a sampling device leaves the deck during deployment or breaks the surface upon retrieval. If the winch operator is remotely located from the

scene of operations, a clear system of signals must be established between the lead deck person and the winch operator, usually via hand signals or electronic communication.

OSHA requires that hard hats be worn when working beneath suspended equipment, or when the potential of injury to the head exists due to lateral impact. All crew members should have a suitable level of seamanship skills, based upon their level of responsibility. Listed below are some of the items related to seamanship and gear-handling that, when overlooked, have been known to cause serious accidents on board ship.

- A capstan is potentially more dangerous than a winch drum, as the wraps are not enclosed and could instantly slip off the end if not handled properly.
- If a hydraulic hose fails, winches can free-wheel, and load-bearing rams can collapse under a load unless backed up with balance-check valves.
- Different kinds of line and wire rope have different characteristics, which may not be suitable for all applications (e.g., nylon is 25 percent stronger than polypropylene, but it is much more elastic and can be lethal if parted under a strain; polypropylene will float, making it less susceptible to propeller entanglement).
- An eye splice over a thimble will only cause a 5 percent reduction in line strength, but a knot (depending on type) can reduce the strength in a line by as much as 55 percent due to unequal strain on the fibers (a line will usually break under a strain at that point where it is forced to bend).
- Theoretically, the longer a line under a strain, the weaker it is when compared against its rated breaking strength (the chances are statistically greater of encountering a section weaker than the last as line length increases).
- The recommended working load-to-breaking strain for wire rope and line is typically 1 to 5. If the load ever exceeds 75 percent of the breaking strength, permanent damage could result, which can lead to unexpected breakage.
- Topside operations may be more dangerous on larger ships than smaller vessels because it is harder to keep track of safety concerns when activities are spread over a larger area of deck.
- Crew members should always stand clear of slack or looped line lying on deck to avoid entanglement. A sudden strain on slack line can entrap arms and legs; personnel may be severely injured or carried overboard.

In the event the sediment grab or winch wire becomes entangled in an object on the bottom, in the ship's propellers, or as a result of a malfunction in the winch or a-frame, the personnel on the bridge will be notified immediately.

The Operations Manager conducting sampling operations will confer with the ship's master and will direct the survey team members and vessel personnel in order that the situation is safely resolved.

Inclement weather may introduce additional hazards. Heavy equipment can be much more difficult to manage, and footing may become unsure due to slippery decks and/or increased vessel motion, and the risk of falling overboard may increase. Some state agencies requires that all railings be a minimum of 36 inches in height, and OSHA requires that an approved life vest be donned when working over the water or if there is an increased risk of falling overboard. A safety line will be secured across the opening from which the survey equipment will be deployed and retrieved. Vessel accommodations should be able to provide relief to crew members in case of cold or heat stress.

The vessel's Captain is responsible for determining the relative safety due to inclement weather on all operations. If necessary, survey operations will be suspended. The Captain will decide whether to stay on station or transit to port until weather conditions improve. If operations are suspended the Operations Manager will direct the movement and securing of equipment and materials until sampling resumes.

Concern: Chemicals.
Precaution(s): Familiarization with use and handling of chemicals to be used on project. Splash-proof goggles, organic vapor masks, and protective gloves will be used when handling chemicals. Chemicals will only be used in well-ventilated areas.

Concern: Acids, bases, and other hazardous chemicals.
Precaution(s): Briefing and MSDS sheets regarding all hazardous chemicals. Use of rubber gloves when handling dangerous chemicals such as water quality fixatives. Availability of first aid kits, eye wash kits, and spill kits. Prior to applicable activities, the Site Safety Coordinator will remind survey team members of the location of first aid kits, eye wash kits, and spill kits.

Precautions should be taken when handling hazardous materials during sampling and sample processing. Gloves and safety glasses should be worn as needed.

Concern: Man overboard.
Precaution(s): Single (one) employee is not allowed on rear deck of the vessel alone – two men or more are required on deck during at-sea operations. All employees are to wear PFDs while on deck of the vessel.

3.4.3 Winch and Davit Operations and Safety Procedures

CSA will be utilizing the services of Coastal Marine Logistics (CML) who will provide the vessel M/V Green Provider to facilitate the sampling effort. An a-frame/davit was constructed to serve as the deployment/retrieval system for the rosette water sampler. The a-frame/davit is welded to the gunwale and deck and exceeds any loads anticipated for the field survey tasks. The winch will be the CSA deepwater electro-hydraulic unit manufactured by Sea-Mac.

CSA and CML are responsible for training field personnel in the safe working procedures of the equipment being utilized for this project. Under the terms of the contract, CSA and CML will provide competent personnel to carry out the work. As such CSA and CML will address the a-frame, davit, and winch systems which include electro-hydraulic winches and hydraulic power units (HPU). The purpose of this document is to outline a systematic approach to mobilization, training, and standards which will optimize safety and program efficiency.

Systems safety and operational planning and implementation are a two-tier function:

1. Pre-cruise planning will address the specific operational requirements associated with the equipment. It is the responsibility of the Operations Manager to ensure that all requirements relative to mobilization, operation, and maintenance are implemented through in-house planning and discussion.

2. On-board, prior to the actual operation, it is the Operations Managers responsibility to coordinate mobilization, training, and operational procedures with the ship's Captain and crew, CSA Technicians, Project Scientist, and Operations group. This is to ensure that all individuals involved clearly understand what is required of them and that all equipment is appropriate and have been inspected.

The following points will be addressed during the Pre-mobilization Safety Briefing and Operations Training:

- Read all warning tag information and become familiar with all controls before operating winch.
- Never attempt to clean, oil, or perform any maintenance on a machine with the engine or prime mover running, unless instructed to do so.

- Never operate winch controls unless you are properly positioned at the operator's station and you are sure personnel are clear of the work area.
- Assure that personnel who are responsible for hand signals are clearly visible and that the signals to be used are thoroughly understood by everyone.
- Ground personnel should stay in view of the operator and clear of winch drum. Do not allow ground personnel near winch line under tension. A safe distance of at least 1-1/2 times the length of the unspooled cable should be maintained.
- Inspect rigging and winch at the beginning of each work shift. Defects should be corrected immediately.
- Keep equipment in good operating condition.
- Do not exceed the maximum pressure, PSI (kPa), or flow, GPM (LPM), stated in the winch specifications for hydraulically driven winches.
- Match winch line speeds to job conditions.
- Leather gloves should be used when handling winch cable.
- Never attempt to handle winch cable when the hook end is not free. Keep all parts of body and clothing clear of cable rollers, cable entry area of fairleads and the winch drum.
- When winding winch cable on the winch drum, never attempt to maintain tension by allowing winch cable to slip through hands. Always use "hand-over-hand" techniques, being careful to keep hands and clothing away from winch drum and fairlead rollers.
- Never use winch cable with broken strands. Replace winch cable.
- Do not weld on any part of the winch.
- Use recommended hydraulic oil and gear lubricant.
- Install guarding to prevent personnel from getting any part of body or clothing caught at a point where the cable is wrapped onto the drum or drawn through guide rollers.
- Install switches or valves which will shut off power to the winch in locations where they can be reached by anyone entangled in the cable before being drawn into the winch or any "pinch-point."
- "Deadman" controls, which automatically shut off power to the winch whenever the operator leaves his station, should be installed whenever practical.
- Never allow anyone to stand under a suspended load.
- Avoid sudden "shock" loads or attempting to "jerk" load free. This type of operation may cause heavy loads in excess of rated capacity, which may result in failure of cable and winch.
- It is imperative that the person operating the unit follow directions while maintaining situational awareness for the task at hand.

Never put your hands into, around, or near the spool or rollers when operating.
Serious injury can occur!

3.4.4 Demobilization

At the completion of all planned survey tasks there can exist the opportunity for injury due to survey team members and ships crew rushing demobilization efforts. When these demobilization procedures are performed too quickly the risk of an accident is increased.

3.4.4.1 Offshore

Concern: Personnel anxious to disembark vessel.
Precaution(s): Must use cautious, methodical procedures.

Concern: Loose trash/debris.
Precaution(s): All trash/debris will be stored and removed.

Concern: Transferring equipment/personnel from vessel to dock. Dropped objects
Precaution(s): PFDs required (see also slippery deck hazard).

3.4.4.2 Onshore

Concern: Personnel anxious to disembark.
Precaution(s): Must use cautious, methodical procedures.

Concern: Loose trash/debris.
Precaution(s): All trash/debris will be stored and removed.

Concern: Safe disposal of trash, hazardous chemicals, fixatives, etc.
Precaution(s): Careful identification, marking, disposal, packing, and transport (if required) of hazardous materials. Proper neutralization of chemicals will be completed if required.

Concern: Leakage of sample preservatives (mostly formaldehyde).
Precautions: Briefing on safe handling of formaldehyde and other possible fixatives. Double bagging of fixed samples, eyewash capabilities, flushing of neutralization of skin contact.

3.5 Emergency Program

The vessel master has a direct responsibility for the health, safety and welfare of all persons on board and for dealing with the immediate response to emergencies. In the event of an emergency CSA will provide emergency response management in cooperation with the vessel's captain to insure the health, safety, and welfare of all persons on board. The Site Safety Coordinator will work along side the captain in the event of a medical emergency.

In the event of injury or illness to personnel, CSA have responsibility for the evacuation of any person on board from the vessel to the nearest port or heliport, depending upon the nature and severity of injuries. From there CSA have responsibility to transfer their own and subcontractor personnel to hospital for treatment. ENTRIX has responsibility for the transfer, hospitalization and ongoing welfare of their own personnel. CSA and their subcontractors have full responsibility for the response to and management of all emergencies arising onboard or involving the vessel.

CSA will mobilize an AED and First Aid Kit for the survey. All CSA personnel are trained in the proper use of an AED and First Aid administration.

3.5.1 Personnel on Board (POB)/Next of Kin (NOK)

A POB/NOK list for the vessel shall be issued prior to departure from the harbor and will be updated should personnel change out, which is not currently planned. Copies of the vessel POB/NOK lists will be transmitted to CSA and ENTRIX offices. All parties will undertake to keep the NOK information confidential.

In the event of an emergency, CSA where necessary shall liaise with the relevant authorities and provide a verified POB list. The onshore response personnel of CSA (and 3rd party contractors if necessary), will be responsible for providing support to relatives of CSA personnel and subcontractors on board during an emergency. The ENTRIX response team would take this responsibility for ENTRIX vessel personnel.

Prior to vessel mobilization medical evacuation support services were researched in south Louisiana. A hospital and helicopter service, identified prior to mobilization, will be contacted in the event of an emergency.

3.5.2 Overall Strategy

An emergency is defined as an unplanned event, or situation, which poses an actual or potential threat to the safety or integrity of:

- Life and limb or health of personnel on board the vessel
- The environment or,
- The reputation of CSA or ENTRIX

An emergency can be further defined as any event, incident or situation, which poses a continuing threat and requires the mobilization of assistance or support from sources external to the affected party.

Both offshore and onshore emergency response actions will be clear, co-coordinated and will be based on the agreed arrangements listed in this document.

CSA emergency response team will take the lead role in responding to all emergencies.

Local services will respond in an emergency to provide support to CSA. Depending upon the nature and scale of the emergency, the CSA shore support may also respond.

In event of an emergency, a number of CSA personnel will remain on call for the duration of the ENTRIX contract. CSA will have a team on standby in Florida to provide support, consisting of the CSA HSE Manager, an Operations Manager, and other support personnel as required.

Vessel

The vessel captain and the CSA Site Safety Coordinator in cooperation with the ENTRIX HSE field representative will insure Muster, Fire, MOB, loss of power, and Communication drills will be run before beginning field tasks. The Fire drill will include pressure to and discharge of the fire hoses.

3.5.3 Post Event Incident Reporting

Formal written reports will be prepared by CSA after an emergency has been resolved. A report need not be final, but may be an interim or preliminary document. A report should not only identify the sequence of events and causes of the incident, but also the adequacy of the response and corrective actions.

3.5.4 Emergency Response

Responsibilities during an emergency include the following:

Offshore Response

Vessel Master-M/V Green Provider	
Responsibility:	Safety of all persons on board the vessel Overall control of the vessel Emergency Response Team On-scene commander Liaison with other vessels if in the survey area Obtaining medical advice as required
Actions:	Controlling emergency and safeguarding personnel Notify the relevant authorities, if necessary Notify CSA On-Duty Operations Notify the ENTRIX representative on the vessel Calling onshore medical authorities
ENTRIX HSE Representative	
Responsibility:	Providing assistance to the Vessel Master as requested Initial notification of ENTRIX HSE Manager
Actions:	Call duty person as above and inform them of nature of emergency and onshore assistance if required.

Local Onshore Response

CSA Project Manager	
Responsibility:	Primacy for supporting the vessel and coordinating the onshore emergency response in accordance with CSA Emergency Response procedures.
Actions:	Coordination of emergency response via the existing CSA emergency response organisation and arrangements, including provision of logistical support Notification of and Liaison with external agencies including Medical Support Notification and regular updating of ENTRIX representative. Informing CSA personnel and subcontractor NOK of injuries etc. Arranging medivacs to shore in response to injuries, illness or other incidents on board for all POB. Arranging reception and transfer to hospital for any injured CSA or subcontractor personnel
ENTRIX HSE Manager	
Responsibility:	The health, safety and welfare of ENTRIX personnel involved in any emergency, once they have returned to shore. The reputation and standing of ENTRIX
Actions:	Mobilize to ENTRIX offices in response to call out from ENTRIX Survey Rep. Keep updated of events via CSA emergency personnel Make arrangements to meet and greet any injured or affected ENTRIX personnel in port or heliport as required Arrange transfer and hospitalization of injured ENTRIX personnel as required Arrange for medivacs as required for ENTRIX personnel Ensure notification of NOK for any affected ENTRIX personnel. Seek support on preparation and issue of media statements as required, in conjunction with CSA.

3.5.5 Emergency Response Organization

The response organization for the baseline environmental survey is shown in **Figure 2** below. Call out and communication routes are also shown in this figure.

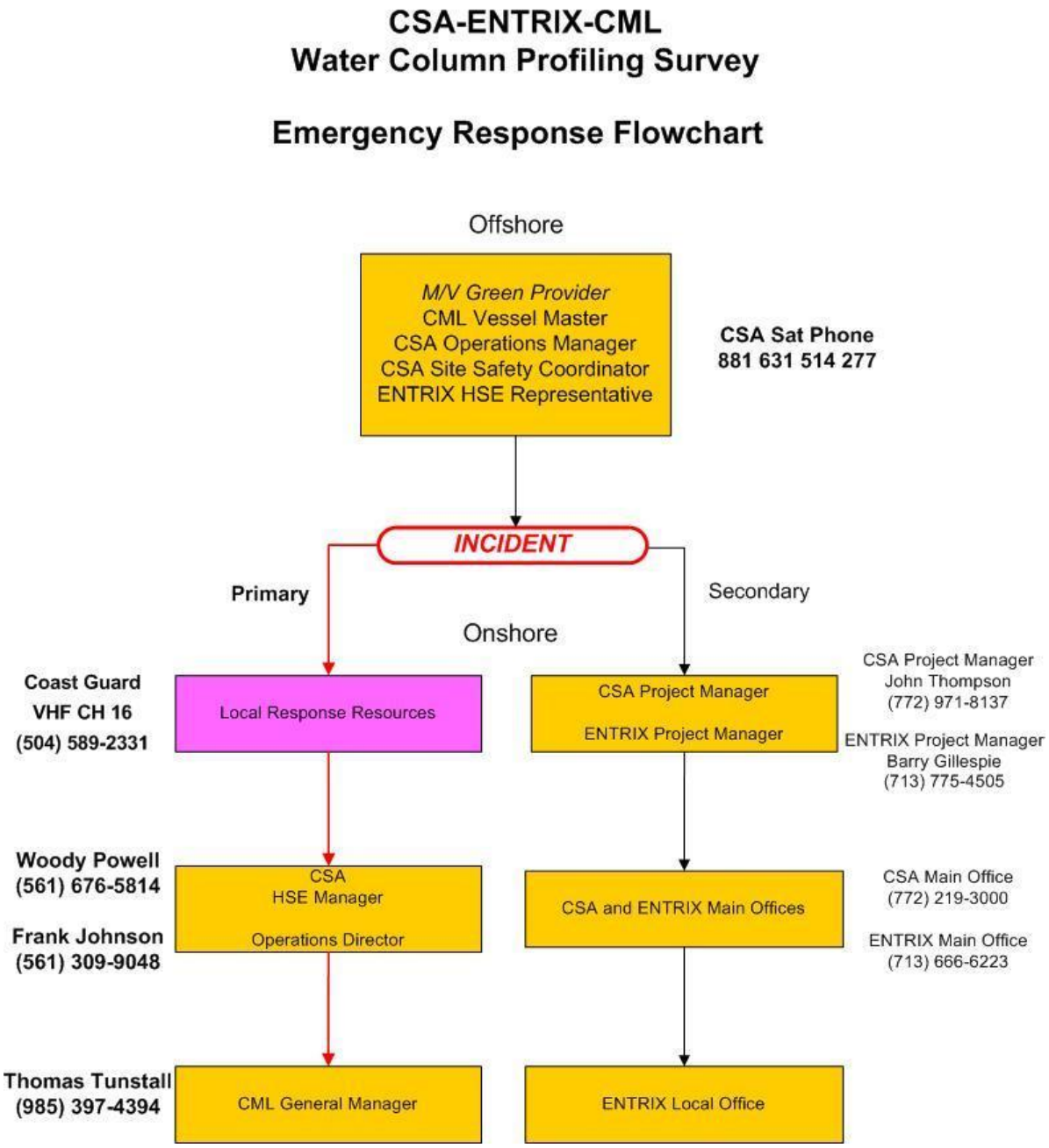


Figure 2. Emergency Response Organization Flowchart

3.5.6 Medivac Plan

Should a medical emergency require the immediate evacuation of a person or persons from the survey vessel, the vessel should immediately head toward the nearest shore facility. The Coast Guard should be contacted immediately on VHF channel 16. The Coast Guard air station is located approximately 13 miles south of New Orleans in Belle Chasse, La

Any applicable client transport coordinators or helicopter dispatchers should be contacted by either satellite phone or cellular telephone for assistance with the emergency. They will arrange helicopter evacuation of the injured person(s) from the platform or shore facility to the nearest emergency medical facility. If medical treatment is needed for a non-life threatening situation, the vessel should head to the nearest shore facility from which the injured person(s) can then travel to the nearest medical facility to obtain necessary medical treatment.

The arrangements listed in this document shall apply to the Emergency Response Procedures for the period that the vessel is contracted for the purpose of completing the survey.

Emergency contact numbers for communications during emergency situations are provided below.

Vessel Emergency Contact Numbers

Vessel-M/V Green Provider	
Master	
Satellite Phone	
Vessel Call Sign	
Thomas Tunstall, Coastal Marine Logistics	+1 985-397-4394

CSA Emergency Contact Numbers

CSA	
Satellite Phone-OnBoard Vessel	+1 881-631-614-566
Fred Ayer, CSA Project Manager	+1 772-219-3039 (Office) +1 561-371-4921 (Mobile)
Gordon Stevens, CSA Operations	+1 772-219-3076 (Office) +1 407-310-3053 (Mobile)
Lynwood Powell, HSE Manager	+1 772-219-3040 (Office) +1 561-676-5814 (Mobile)

ENTRIX Emergency Contact Numbers

ENTRIX	
Ryan Holem, HSE Manager	+1 517-347-7676 (Direct Office) +1 517-881-4558 (Mobile)

4.0 MEDICAL/FIRST AID PROGRAM

CSA personnel are all properly trained in cardio-pulmonary resuscitation (CPR) and first aid. Training allows CSA personnel to give immediate and temporary care to a victim of an accident or sudden illness until a physician can be obtained. This effective first aid consists of common sense, training, and knowledge of the following:

- Procedures for treating bleeding;
- Procedures for heart attack victims;
- Procedures for choking victims;
- Procedures for treating victims of burns;
- Procedures for treating electric shock victims;
- Procedures for treating victims of exposure to chemicals;
- Procedures for treating victims of inhalation of toxic gas or smoke;
- Procedures for treating shock victims;
- Procedures for treating victims of heat exhaustion;
- Procedures for treating victims of heat stroke;
- Procedures for treating victims of frostbite;
- Procedures for treating victims of hyperthermia; and
- Procedures for treating victims of skin poisoning or swallowed poisons.

5.0 SUBSTANCE ABUSE PROGRAM

CSA is committed to maintaining a drug-free workplace. In recognition of the dangers to our employees and the company of drug abuse in the workplace, and pursuant to the provisions of the U.S. Drug-Free Workplace Act of 1988 and Federal Acquisition Regulation 23.504, all employees are subject to the following:

- Unlawfully manufacturing, distributing, dispensing, possessing, or using a controlled substance is prohibited in the workplace.
- Any employee who unlawfully manufactures, distributes, dispenses, possesses or uses a controlled substance in the workplace will be subject to discipline up to and including dismissal.
- All employees, as a condition of continued employment, must abide by the statement and are required to notify the company of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction.
- This Drug-Free Workplace Statement does not amend, limit, restrict, modify or otherwise alter any other company rules, regulations, procedures or policies.

CSA employees tested for substance abuse must meet the U.S. Department of Transportation (DOT) standards for drug and alcohol testing to be able to work as CSA's representatives on designated projects. The medical forms may be made available for the client's inspection with prior approval from the employee.

DOT regulations require screening for the following drugs (known as the NIDA 5 Panel):

- Marijuana;
- Barbiturates;
- Opiates;
- Amphetamines;
- PCP; and
- Cocaine.

6.0 PERSONAL PROTECTIVE EQUIPMENT SAFETY PROGRAM

The following outlines CSA policy pertaining to the issuance and use of certain personal protective equipment (PPE) that will be issued by CSA. Each employee will be responsible for ensuring his PPE is kept clean and in good working condition.

Protective gear for sampling personnel should include the following:

- a hard hat;
- steel-toe shoe/boots;
- equipment handling and chemical-resistant gloves (e.g., leather or Nitrile);
- safety glasses/goggles;
- respiratory protection;
- rain gear (if necessary);
- coldwater survival gear (if necessary); and
- hearing protection (if safe noise levels are exceeded).

In addition to the above PPE personnel deploying and retrieving equipment over the side of the vessel will be required to wear a safety harness and utilize a retractable lifeline securely connected to a point on the vessel.

It is important to note that the ship's captain has the ultimate responsibility and authority to immediately override the authority of all other on board personnel, especially where the general welfare of crew and vessel are concerned.

During the dockside mobilization, the Site Safety Coordinator will conduct an inventory of the safety-related equipment and materials and provide a report to the Project Scientist and Operation Manager of their status, location, and availability.

Hard Hats. Each employee will be expected to wear a hard hat at all times when working out on deck. These safety hats will meet the specifications contained in American National Standards Institute, Z89.1-1969, Safety Requirements for Industrial Head Protection.

Steel-toed Shoes/Boots. Steel-toed shoes or boots will be required while outside of office area or on any work site, e.g., work deck.

Gloves – Work and Chemical. Work gloves will be provided for handling of equipment and supplies to reduce the potential of hand injuries. Nitrile, rubber, gloves will be provided for the handling of all chemicals and solvents.

Safety Glasses/Goggles. All employees will be issued and must wear approved safety glasses with side shields at all times while in the work area. Those employees who wear prescription glasses will wear safety glasses over their glasses. This also applies to those employees who wear contact lenses.

All employees will be issued and expected to wear 1) approved impact-type goggles with side shields when engaging in any activity that involves hazards to the unprotected eye from chipped or flying particles; and 2) approved splash proof goggles when they are handling hazardous chemical liquids, powders, or vapors as well as when they are in the vicinity of these chemicals.

Employees who wear prescription glasses will wear goggles over their glasses. This also applies to employees who wear contact lenses; these employees must make it apparent that they do wear contact lenses.

Respiratory masks
Protective respiratory mask will be provided to all employees. Any employee handling chemicals or solvents is required to wear a respiratory mask in addition to gloves and goggles.

Protective Outerwear
An outerwear capable of protecting the employee from oily products will be worn during all sampling operations. A Tyvek or suitable alternative is required.

Rain gear
Rain gear is not provided for most offshore surveys. It is the responsibility of the employee to provide adequate protection when working outside of the confines of the vessel.

Cold water survival gear
Cold water survival gear will not be necessary for this survey due to the time of year and the location of the survey area.

Hearing protection
Hearing protection is mandatory in all designated high noise areas. Ear plugs and ear muffs will be provided.

During operations which require special equipment and outerwear, the previously mentioned mandatory equipment and requirements pertaining to the equipment may be voided or amended.

7.0 HEARING CONSERVATION PROGRAM

All employees will wear the appropriate hearing protection provided by CSA while in a high noise area (85 decibels [dBA] or above for an 8-hour time period). A sign will be posted in high noise areas.

The Site Safety Coordinator will ensure any employees working in a high noise area are wearing hearing protection.

CSA also urges its employees to use common sense in a "noisy environment." If it is necessary to shout to communicate, an area is considered a high noise area whether or not signs are posted.

8.0 LIFE SAVING EQUIPMENT

All personnel working or riding on the deck of a boat or barge, or when transferring between vessels or onto a platform, must wear a U.S. Coast Guard (USCG)-approved PFD with reflector tape strips. There will be one PFD for each employee. On-board personnel should familiarize themselves with the ship's man overboard procedures and the vessel's life saving equipment location.

9.0 MOB AND FIRE EMERGENCY PROCEDURES

9.1 MAN OVERBOARD

- Throw a ring buoy overboard as close to the person as possible.
- Notify the personnel on the bridge immediately; bridge records vessel position.
- Post a lookout to keep the person overboard in sight.
- Maneuver the vessel to pick up the person in the water.
- Crew member wearing a PFD attaches a safety line and stands by to jump into the water to assist the person overboard if necessary.
- If person is not immediately located, notify Coast Guard and other vessels in the area by radio telephone.
- Continue search until released by the Coast Guard.

9.2 RULES FOR ABANDONMENT

- Review rules posted on vessel prior to vessel leaving dock.
- Take instructions from vessel's captain and proceed to pre-assigned station on the vessel.

9.3 FIRE ON BOARD

- Review rules posted on vessel prior to vessel leaving dock.
- When alarm sounds proceed to pre-assigned station on the vessel.
- Vessel’s captain will instruct survey team members.

10.0 WATER SURVIVAL PLAN

All employees must become familiar with the use and operation of survival gear and emergency instructions posted on the vessel.

In case of vessel evacuation:

1. Put on a PFD and remove your safety hat.
2. Do not dive into the water but jump in feet first.
3. If swimming in rough water, turn your back to the wind or waves. Keep your head out of water and use a breast stroke.
4. If there is an oil or fuel fire on the water, swim UNDER the water. Before surfacing, use your hands to splash a breathing hole above your head. Close your eyes before surfacing, take a breath, and then resubmerge (feet first).
5. If there is oil and/or debris on the water surface, keep your head up and out of the water. Push the oil/debris away from you as you swim. Protect eyes, nose, and mouth.
6. If swimming in cold water, conserve body heat, and help to prevent hypothermia by minimizing movement.
7. Do not swim to rescuers – let them come to you.

CONSERVE YOUR ENERGY! YOUR SURVIVAL MAY DEPEND ON IT!

11.0 EQUIPMENT INSPECTION PROGRAM

CSA will insure the following equipment is aboard the vessel:

- Fire extinguishers;
- PFDs;
- Safety Harnesses;
- Retractable lifelines;
- Ear protectors;
- Hard hats;
- Safety glasses;
- Safety shoes;
- Organic vapor masks; and
- Protective gloves.

The above equipment shall be inspected daily prior to use for wear and tear and so noted by the designated CSA safety person in his Project Log. During daily inspections, emphasis will be put on equipment security (i.e., safely secured for rough seas), and equipment maintenance.

The safety person will be knowledgeable with U.S. 29 CFR 1926 (Subparts E, F, I, J, K, L, N, and O): Personal Protective and Life Saving Equipment; Fire Protection and Prevention; Tools (Hand/Power); Welding and Cutting; Electrical; Ladders and Scaffolding; Cranes, Derricks, Hoists, Elevators, and Conveyors; Motor Vehicles, Mechanized Equipment, and Marine Operations.

12.0 ELECTRICAL SAFETY PROGRAM

12.1 INSTALLATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT

All installation and maintenance of electrical equipment must comply with the pertinent provisions of the national electrical code. All electrical work will be performed by competent personnel who are familiar with code requirements and qualified for the class of work to be performed. All applicable electrical wire, apparatus, and equipment will be of a type approved by Underwriters Laboratories, Inc., Factory Mutual Engineering Corp., or any other nationally recognized testing laboratory.

12.2 ELECTRICAL ACCIDENT PREVENTION PROCEDURES

The best qualified available employee will be appointed to be the electrical job supervisor. That person will have total responsibility for the electrical work.

Each job should be thoroughly planned, making sure that adequate and proper equipment and sufficient personnel are available to perform the job safely. No job is to be rushed to completion at the expense of safety.

A special safety meeting will be conducted before starting a job to brief all workers involved to make sure all questions are answered and that no confusion exists among the workers.

All possible circuits in the vicinity of the work area should be de-energized and secured in this condition by grounding, locking, and tagging. If it is not possible to de-energize all circuits, use barriers, rubber goods, or any other protective equipment necessary to make the work area safe. Danger signs will be displayed in appropriate locations and on associated equipment as required to afford maximum personnel protection.

Complete attention should be devoted to the job at hand. Preoccupation or day-dreaming cannot be tolerated while working with electrical equipment.

Even low voltage (e.g., 32 volts AC) as well as many battery-powered systems are hazardous and require proper precautions.

All unsafe electrical equipment should be de-energized immediately and tagged "unsafe for use." This action and also notification of inoperable or damaged electrical tools, appliances, etc., should be reported to the immediate supervisor at once. Unqualified persons should not attempt to repair such equipment.

Under no circumstances should the hand or finger be used to test for voltage in a circuit. Only proper and safe test instruments should be used.

In case of an accident or an electrical fire, all power should be cut off immediately. Emergency switches are generally installed at convenient locations to stop electrical machinery. Know where these switches are. Use only fire extinguishers which have been approved for use on an electrical fire. Foamite or other conductive fluids, including water, must not be used on an electrical fire under any circumstances.

Electrical work of any kind will not be performed if an electrical storm is in progress in the immediate vicinity.

Adverse conditions such as darkness, poor weather, isolation, or any abnormal situations may make working alone unduly hazardous. These occasions should be identified by established management guidelines from which the employee can carefully assess the task to be performed and determine whatever assistance might be necessary to perform the job safely. All electrical conductors and equipment will be approved and meet the standards in 29 CFR Subpart K covering the electrical equipment and work practices for this project (copy follows).

13.0 SPILL PREVENTIVE/CLEANUP PLAN

All personnel involved on a project should be aware of all possible polluting situations and take steps to prevent such occurrences.

CSA Operations Managers will insure the MARPOL rules and regulations are posted on the vessel and are followed by all members of the survey team.

Should a spill occur, the following will be available:

- Absorbent pads for use on local spills on vessel and, if necessary, small discharges into the water;
- Absorbent booms for installation around drums and apparatus that could cause a spill on vessel;
- Should portable generators/winches be used that involve fueling, a catchment tray will be provided to prevent gasoline/oil or other fluids from being spilled;
- Shore personnel to locate suitable disposal container close to dock for trash removal from vessel; and
- Trash bags and ties for general trash storage will be provided on vessel.

In case of large spills, the vessel is to cease operations, stay in the area and call in to the local client base, local Coast Guard, or other appropriate regulatory agency.

PICK UP ANY TRASH YOU SEE -- NOT JUST YOUR OWN.
AND REMEMBER NO TRASH/DEBRIS/WASTE/POLLUTANT IS TO BE DEPOSITED ANYWHERE BUT IN THE CORRECT RECEPTACLE.

14.0 SHORT-TERM EMPLOYEE PROGRAM

Any CSA employees that have been with the company less than six months will be identified as "Short-Term Employees" to all personnel including the client or its agent prior to start-up and mobilization of project.

Short-term employees will be given a job-specific orientation prior to the general job safety meeting dealing with the client's site safety expectations and procedures and hands-on training by CSA for upcoming job assignments.

Short-term employees will expect to be given special supervision during their 90-day probationary period with the orientation reinforced at the end of their first week's employment with CSA and at the end of their first month's employment. The employee will then be evaluated by their supervisor monthly for the next three months. It is implied here and to be understood by the short-term employee that he will be teamed with an experienced employee whenever possible. Under no circumstances will two short-term employees be teamed on a job without approval.

APPENDIX

APPENDIX A

Hazards Analysis/Risk Assessment

HAZARDS ANALYSIS/RISK ASSESSMENT

Hazard	Consequences/Risk	Severity	Safeguard(s)/Control Measure(s)	Risk Matrix		Recommendations	Responsibility	Status
				Likelihood	Risk Rank			
Lifting accidents, dropped equipment	Injuries, damage to or loss of equipment/material	Major	Lifting procedures, lift plan, worker awareness, qualified/experienced personnel	Remote	B	Review procedures in toolbox meeting prior to activity	Operations Supervisor	Open
Boarding/loading boats	Trips, falls, injuries, damage to or loss of equipment	Minor	Designated boarding/ loading areas and procedures, first aid, clear work procedures	Infrequent	A	Review procedures in toolbox meeting prior to activity	Operations Supervisor	Open
Navigation and positioning control	Wrong locations, work delays, impact to work productivity	Moderate	Obtain latest nautical charts, set up and check CSA vessel GPS navigation during mobilization, prepare pre-plots, provide accurate locations, provide coordinates in a digital exchange file	Remote	B	Confirm accuracy of coordinates through backup GPS	Project Scientist	Open
Deployment/handling of sample collection equipment	Pinching injury, impact/crushing injury, entanglement, MOB	Moderate	Worker training, established procedures, work gloves, HSE briefing	Infrequent	B	Review procedures in toolbox meeting prior to activity	Operations Supervisor	Open
Man overboard (MOB)	Loss of personnel	Major	PFDs, work deck rules, safety chain, MOB procedures	Infrequent	C	Review procedures in toolbox meeting prior to activity	Operations Supervisor	Open
General health and safety (offshore/on water)	Heat exhaustion and overheating, exposure, dehydration, minor injuries	Moderate	Adequate drinking water available, sunscreen, light clothing, clear decks, designated work areas and clear work procedures, first aid	Infrequent	B	Review during HSE induction	Operations Supervisor	Open
Spillage of fuels, oils, and lubricants	Environmental degradation, regulatory fines, damage to reputation	Major	Refueling on land or in port only, adequate capacity for full-day operations	Infrequent	C	Review procedures in toolbox meeting prior to activity	Operations Supervisor	Open
General health and safety (onshore)	Exposure, dehydration, minor injury	Moderate	Adequate shade, adequate drinking water available, sunscreen, light clothing, clear/designated work areas, clear work procedures, work breaks	Infrequent	B	Review during HSE induction	Operations Supervisor	Open
Road/driving accidents	Collisions, damage to vehicles or equipment, injury	Major	Use of licensed and experienced drivers, safe driving at posted speeds, seatbelts	Remote	B	Review procedures in toolbox meeting prior to activity	Operations Supervisor	Open

Hazard	Consequences/Risk	Severity	Safeguard(s)/Control Measure(s)	Risk Matrix		Recommendations	Responsibility	Status
				Likelihood	Risk Rank			
Food-/water-/blood-borne pathogens	Debilitating illness, impacts to productivity	Moderate	Worker training, HSE briefing, emergency response plan	Infrequent	B	Review during HSE induction	Operations Supervisor	Open
Unsafe weather/sea state conditions	Damage to vessels	Major	Weather forecast reviews, continuous monitoring of local weather, ongoing communications, delay/cancel/abort weather thresholds	Remote	B	Conduct continuous monitoring of weather while on site, morning forecast reviews and postpone mobilization if predicted to exceed limitations	Operations Supervisor	Open
Rough sea conditions	Injuries, MOB, damage to or loss of equipment/materials	Moderate	Check for secure deck and equipment/materials before getting underway, use of PFDs	Infrequent	B	Cross check for clear deck prior to getting underway	Operations Supervisor	Open
Vessel mechanical failure or damage	Loss of vessel, vessel adrift, stranded divers	Major	Rigorous vessel maintenance and inspection, standby vessel, float plan, established communications	Remote	B	Ensure valid vessel inspections, pre-day vessel checklists	Vessel Master	Open
Unsafe deck conditions (e.g., wet, cluttered)	Slips, trips, falls, MOB, damage to equipment	Major	Clear decks, designated work areas, clear work procedures, emergency response plan	Frequent	D	Review procedures and PPE requirements in toolbox meeting prior to activity; install safety line across stern	Vessel Master	Open
Underwater obstructions, contact with bottom, grounding	Damage to seabed features/organisms, damage to boats/ equipment, injuries	Major	Review of nautical charts, mapping of navigation hazards, experienced boat operators	Remote	B	Review transit route for obstructions, shallow water	Vessel Master	Open
Other vessel/traffic shipping	Collisions	Major	Deck watch	Remote	B	Review of shipping patterns, contact any vessels in vicinity	Vessel Master	Open
Medical emergencies (injured/unconscious worker), limited timely medical access/support	Lack of/late medical attention leading to medical complications, possibly disablement/ fatality	Major	Emergency procedures for worker extraction, established communications to shore, standby vessel, local emergency support, emergency response plan, emergency oxygen on-board, comprehensive first aid equipment	Remote	B	Prior arrangements with Port/ambulance, advice to Navy and/or Coast Guard; post-emergency contact infomation readily available on all vessels/boats	Operations Supervisor	Open
Emergency preparedness	Inadequate response to emergencies	Minor	Conduct weekly drills, HSE inspection to review emergency systems	Infrequent	A	Review procedures in toolbox meeting prior to activity	Operations Supervisor	Open

Hazard	Consequences/Risk	Severity	Safeguard(s)/Control Measure(s)	Risk Matrix		Recommendations	Responsibility	Status
				Likelihood	Risk Rank			
Confined Space Entry	Loss of consciousness, fatality, impact to work productivity	Major	Real-time air monitoring, forced air ventilation, full body harness, rescue tri-pod	Remote	B	Review procedures in toolbox meeting prior to activity	Site Safety Officer	Open

APPENDIX B

MSDS for Project chemicals

Project Chemicals:

Liquinox

Isopropyl Alcohol

Hexane

msds liquinox english ansi

LIQUINOX MSDS

Section 1 : PRODUCT AND COMPANY IDENTIFICATION

Chemical family: Detergent.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Supplier: Same as manufacturer.

Product name: Liquinox

Section 2 : INGREDIENT INFORMATION

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE

Section 3 : HAZARD IDENTIFICATION

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of acute exposure

Eye contact: May cause irritation.

Skin contact: Prolonged and repeated contact may cause irritation.

Inhalation: May cause headache and nausea.

Ingestion: May cause vomiting and diarrhea.
May cause gastric distress.

Effects of chronic exposure: See effects of acute exposure.

Section 4 : FIRST AID MEASURES

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
If irritation persists, seek medical attention.

Ingestion: Do not induce vomiting, seek medical attention.
Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.

Section 5 : FIRE FIGHTING MEASURES

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.
Use water spray to cool fire exposed containers.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Explosion Data

Sensitivity to static discharge: Not available.

Sensitivity to mechanical impact: Not available.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: Containers may rupture if exposed to heat or fire.

Section 6 : ACCIDENTAL RELEASE MEASURES

Leak/Spill: Contain the spill.
Prevent entry into drains, sewers, and other waterways.
Wear appropriate protective equipment.
Small amounts may be flushed to sewer with water.
Soak up with an absorbent material.
Place in appropriate container for disposal.
Notify the appropriate authorities as required.

Section 7 : HANDLING AND STORAGE

Handling procedures and equipment: Protect against physical damage.
Avoid breathing vapors/mists.
Wear personal protective equipment appropriate to task.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Avoid extreme temperatures.
Launder contaminated clothing prior to reuse.

Storage requirements: Store away from incompatible materials.
Keep containers closed when not in use.

Section 8 : EXPOSURE CONTROLS / PERSONAL PROTECTION

Precautionary Measures

Gloves/Type:



Wear appropriate gloves.

Respiratory/Type: None required under normal use.

Eye/Type:



Safety glasses recommended.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Exposure limit of material: Not available.

Section 9 : PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid.

Appearance & odor: Odourless.
Pale yellow.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): @ 20°C (68°F).
17

Vapour density (air=1): >1

Volatiles (%)

By volume: Not available.

Evaporation rate (butyl acetate = 1): < 1.

Boiling point (°C): 100 (212F)

Freezing point (°C): Not available.

pH: 8.5

Specific gravity @ 20 °C: (water = 1).
1.083

Solubility in water (%): Complete.

Coefficient of water\oil dist.: Not available.

VOC: None

Chemical family: Detergent.

Section 10 : STABILITY AND REACTIVITY

Chemical stability: Product is stable under normal handling and storage conditions.

Conditions of instability: Extreme temperatures.

Hazardous polymerization:	Will not occur.
Incompatible substances:	Strong acids. Strong oxidizing agents.
Hazardous decomposition products:	See hazardous combustion products.

Section 11 : TOXICOLOGICAL INFORMATION

LD50 of product, species & route:	> 5000 mg/kg rat oral.
LC50 of product, species & route:	Not available.
Sensitization to product:	Not available.
Carcinogenic effects:	Not listed as a carcinogen.
Reproductive effects:	Not available.
Teratogenicity:	Not available.
Mutagenicity:	Not available.
Synergistic materials:	Not available.

Section 12 : ECOLOGICAL INFORMATION

Environmental toxicity:	No data at this time.
Environmental fate:	No data at this time.

Section 13 : DISPOSAL CONSIDERATIONS

Waste disposal:	In accordance with local and federal regulations.

Section 14 : TRANSPORT INFORMATION

D.O.T. CLASSIFICATION:	Not regulated.
Special shipping information:	Not regulated.

Section 15 : REGULATORY INFORMATION

Canadian Regulatory Information	
WHMIS classification:	Not controlled.
DSL status:	Not available.
USA Regulatory Information	
SARA hazard catagories sections 311/312:	Immediate (Acute) Health Hazard: No. Delayed (Chronic) Health Hazard: No. Fire Hazard: No. Sudden Release of Pressure: No. Reactive: No.
SARA Section 313:	None
TSCA inventory:	All components of this product are listed on the TSCA inventory.

NFPA

Health Hazard: 1

Flammability: 0

Reactivity: 0

HMIS

Health Hazard: 1

Flammability: 0

Physical hazard: 0

PPE: A

Section 16 : OTHER INFORMATION

Supplier MSDS date: 2006/07/14

Data prepared by: Global Safety Management
3340 Peachtree Road, #1800
Atlanta, GA 30326

Phone: 877-683-7460
Fax: (877) 683-7462

Web: www.globalsafetynet.com
Email: info@globalsafetynet.com.

General note: This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.





Health	2
Fire	3
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Isopropyl Alcohol, 70% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Isopropyl Alcohol, 70%

Catalog Codes: SLI1669

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Isopropyl alcohol; Water

CI#: Not available.

Synonym: 2-Propanol, 70%; Isoprpanol, 70%; Isopropyl Rubbing Alcohol

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Isopropyl alcohol	67-63-0	70
Water	7732-18-5	30

Toxicological Data on Ingredients: Isopropyl alcohol: ORAL (LD50): Acute: 5045 mg/kg [Rat]. 3600 mg/kg [Mouse]. 6410 mg/kg [Rabbit]. DERMAL (LD50): Acute: 12800 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, . Slightly hazardous in case of skin contact (sensitizer, permeator). Non-corrosive for skin. Non-corrosive to the eyes. Non-corrosive for lungs.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [Isopropyl alcohol].
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol].

The substance may be toxic to kidneys, liver, skin, central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: The lowest known value is 399°C (750.2°F) (Isopropyl alcohol).

Flash Points: CLOSED CUP: 18.3°C (64.9°F) - 24 deg. C (75 deg. F)

Flammable Limits: The greatest known range is LOWER: 2% UPPER: 12.7% (Isopropyl alcohol)

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat.
Flammable in presence of oxidizing materials.
Non-flammable in presence of shocks

Explosion Hazards in Presence of Various Substances:
Slightly explosive in presence of open flames and sparks, of heat.
Non-explosive in presence of shocks.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME.
Hydrogen peroxide sharply reduces the autoignition temperature of Isopropyl alcohol.
After a delay, Isopropyl alcohol ignites on contact with dioxgenyl tetrafluorborate, chromium trioxide, and potassium tert-butoxide. When heated to decomposition it emits acrid smoke and fumes. (Isopropyl alcohol)

Special Remarks on Explosion Hazards:
Secondary alcohols are readily autooxidized in contact with oxygen or air, forming ketones and hydrogen peroxide. It can become potentially explosive.
It reacts with oxygen to form dangerously unstable peroxides which can concentrate and explode during distillation or evaporation. The presence of 2-butanone increases the reaction rate for peroxide formation.
Explosive in the form of vapor when exposed to heat or flame. May form explosive mixtures with air.
Isopropyl alcohol + phosgene forms isopropyl chloroformate and hydrogen chloride.
In the presence of iron salts, thermal decompositon can occur, whicn in some cases can become explosive.
A homogeneous mixture of concentrated peroxides + isopropyl alcohol are capable of detonation by shock or heat.
Barium perchlorate + isopropyl alcohol gives the highly explosive alkyl perchlorates.
It forms explosive mixtures with trinitormethane and hydrogen peroxide.
It produces a violent explosive reaction when heated with aluminum isopropoxide + crotonaldehyde.
Mixtures of isopropyl alcohol + nitroform are explosive.
(Isopropyl alcohol)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Isopropyl alcohol
TWA: 983 STEL: 1230 (mg/m3) [Australia]
TWA: 200 STEL: 400 (ppm) from ACGIH (TLV) [United States] [1999]
TWA: 980 STEL: 1225 (mg/m3) from NIOSH
TWA: 400 STEL: 500 (ppm) from NIOSH
TWA: 400 STEL: 500 (ppm) [United Kingdom (UK)]
TWA: 999 STEL: 1259 (mg/m3) [United Kingdom (UK)]
TWA: 400 STEL: 500 (ppm) from OSHA (PEL) [United States]
TWA: 980 STEL: 1225 (mg/m3) from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Alcohol like.

Taste: Not available.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Neutral.

Boiling Point: The lowest known value is 82.5°C (180.5°F) (Isopropyl alcohol). Weighted average: 87.75°C (189.9°F)

Melting Point: May start to solidify at -88.5°C (-127.3°F) based on data for: Isopropyl alcohol.

Critical Temperature: The lowest known value is 235°C (455°F) (Isopropyl alcohol).

Specific Gravity: Weighted average: 0.84 (Water = 1)

Vapor Pressure: The highest known value is 4.4 kPa (@ 20°C) (Isopropyl alcohol). Weighted average: 3.77 kPa (@ 20°C)

Vapor Density: The highest known value is 2.07 (Air = 1) (Isopropyl alcohol). Weighted average: 1.63 (Air = 1)

Volatility: Not available.

Odor Threshold: The highest known value is 22 ppm (Isopropyl alcohol)

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility: Easily soluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, flame, ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts violently with hydrogen + palladium combination, nitroform, oleum, COCl2, aluminum triisopropoxide, oxidants
Incompatible with acetaldehyde, chlorine, ethylene oxide, isocyanates, acids, alkaline earth, alkali metals, caustics, amines, crotonaldehyde, phosgene, ammonia.
Isopropyl alcohol reacts with metallic aluminum at high temperatures.
Isopropyl alcohol attacks some plastics, rubber, and coatings.
Vigorous reaction with sodium dichromate + sulfuric acid. (Isopropyl alcohol)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation.

Toxicity to Animals:
Acute oral toxicity (LD50): 5143 mg/kg (Mouse) (Calculated value for the mixture).
Acute dermal toxicity (LD50): 18286 mg/kg (Rabbit) (Calculated value for the mixture).

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [Isopropyl alcohol].
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol].
Contains material which may cause damage to the following organs: kidneys, liver, skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation.
Slightly hazardous in case of skin contact (sensitizer, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive/teratogenic effects (fertility, fetoxicity, developmental abnormalities(developmental toxin)) based on animal studies.
Detected in maternal milk in human. (Isopropyl alcohol)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: May cause mild skin irritation, and sensitization.
Eyes: Can cause eye irritation.
Inhalation: Breathing in small amounts of this material during normal handling is not likely to cause harmful effects. However, breathing large amounts may be harmful and may affect the respiratory system and mucous membranes (irritation), behavior and brain (Central nervous system depression - headache, dizziness, drowsiness, stupor, incoordination, unconciousness, coma and possible death), peripheral nerve and senstation, blood, urinary system, and liver.
Ingestion: Swallowing small amouts during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. Swallowing large amounts may cause gastrointestinal tract irritation with nausea, vomiting and diarrhea, abdominal pain. It also may affect the urinary system, cardiovascular system, sense

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Isopropanol, solution (Isopropyl alcohol) UNNA: 1219 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Isopropyl alcohol
Illinois toxic substances disclosure to employee act: Isopropyl alcohol
Rhode Island RTK hazardous substances: Isopropyl alcohol
Pennsylvania RTK: Isopropyl alcohol
Florida: Isopropyl alcohol
Minnesota: Isopropyl alcohol
Massachusetts RTK: Isopropyl alcohol
New Jersey: Isopropyl alcohol
New Jersey spill list: Isopropyl alcohol
TSCA 8(b) inventory: Isopropyl alcohol; Water
TSCA 4(a) final testing order: Isopropyl alcohol
TSCA 8(a) IUR: Isopropyl alcohol
TSCA 8(d) H and S data reporting: Isopropyl alcohol: Effective date: 12/15/86 Sunset Date: 12/15/96
TSCA 12(b) one time export: Isopropyl alcohol
SARA 313 toxic chemical notification and release reporting: Isopropyl alcohol 70%

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable.
R36- Irritating to eyes.

S2- Keep out of the reach of children.
S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves (impervious).
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:53 PM

Last Updated: 11/06/2008 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Material Safety Data Sheet
Instant FAME/Instant Anaerobe Methods
Hexane

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS Name: Hexane
MSDS Preparation Date: 06/19/2009
Synonyms or Generic ID: n Hexane, Hexyl hydride, Dipropyl, normal Hexane, Hex.
PIN (UN#/ NA#): UN1208
Company Identification:
Microbial ID
125 Sandy Drive
Newark Delaware 19711
For Information, call: (800)276 8068, (302)737 4297
For Domestic CHEMTREC assistance, call: 800 424 9300
For International CHEMTREC assistance, call: 703 527 3887

SECTION 2 – COMPOSITION, INFORMATION ON INGREDIENTS

CAS #	Chemical Name	Percent	EINECS/ELINCS	ACGIH TLV	Hazards
110 54 3	Hexane (contains a mixture of isomers)	100	203 777 6	50 ppm	Flammable, mild irritant

State: Liquid	Appearance: colorless	Odor: Gasoline Like
Boiling Point (C): 62 69°C 760mm HG	pH: not available	Specific Gravity: 0.678
Vapor Pressure (mm Hg): 151mm Hg @ 25°C	Vapor Density (AIR=1): 2.97	
Solubility in Water: insoluble		

SECTION 3 – HAZARDS IDENTIFICATION

Appearance: clear, colorless.

DANGER! Extremely flammable liquid and vapor. Vapor may cause flash fire. Breathing vapors may cause drowsiness and dizziness. Causes eye, skin, and respiratory tract irritation. May be harmful if absorbed through the skin. Aspiration hazard if swallowed. Can enter lungs and cause damage. Possible risk of impaired fertility. Long term exposure may cause damage to the nervous system of the extremities (the hands, arms, legs and feet). Dangerous for the environment.
Target Organs: Central nervous system, respiratory system, eyes, skin, peripheral nervous system, testes.

Potential Health Effects
Eye: Causes mild eye irritation.
Skin: Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. Causes irritation with burning pain, itching, and redness. Absorbed through the skin. There have been no reports of skin sensitization in people occupationally exposed to n hexane. Skin sensitization was not observed in a maximization test using 25 volunteers.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause central nervous system depression.
Inhalation: Causes respiratory tract irritation. Exposure produces central nervous system depression. Vapors may cause dizziness or suffocation. n Hexane vapor concentrations can become so high that oxygen is displaced, especially in confined spaces.

Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis. Prolonged or repeated exposure may cause adverse reproductive effects. Chronic exposure may cause visual disturbances. Laboratory experiments have resulted in mutagenic effects. Peripheral neuropathy symptoms include: muscular weakness, paresthesia, numbing of the hands, feet, legs and arms, unsteadiness, and difficulty in walking and standing. Repeated exposure may cause nervous system abnormalities with muscle weakness and damage, motor incoordination, and sensation disturbances. Chronic exposure produces peripheral neuropathy.

SECTION 4 – FIRST AID MEASURES

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively. For ingestion, the stomach should be intubated, aspirated, and lavaged with a slurry of activated charcoal protect the airway from aspiration of gastric contents. Monitor arterial blood gases in cases of severe aspiration.

SECTION 5 – FIRE FIGHTING MEASURES

General Information: As in any fire, wear a self contained breathing apparatus in pressure demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire exposed containers cool. May accumulate static electrical charges, and may cause ignition of its own vapors. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire.
Extinguishing Media: Use dry chemical, carbon dioxide, or appropriate foam. Solid streams of water may be ineffective and spread material. Water may be ineffective because it will not cool material below its flash point.
Flash Point: 7.6 to 15°C
Autoignition Temperature: 225 deg C (437.00°F)
Explosion Limits, Lower:1.2 vol %
Upper: 7.7 vol %
NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 0

SECTION 6 – ACCIDENTAL RELEASE MEASURES

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Large spills may be neutralized with dilute alkaline solutions of soda ash, or lime. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation. Do not get water inside containers. A vapor suppressing foam may be used to reduce vapors. Absorb spill using an absorbent, non combustible material such as earth, sand or vermiculite.

Material Safety Data Sheet
Instant FAME/Instant Anaerobe Methods
Hexane

SECTION 7-HANDLING AND STORAGE

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor or mist.
Storage: Keep away from heat and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well ventilated area away from incompatible substances.

SECTION 8 – EXPOSURE CONTROL/ PERSONAL PROTECTION

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion proof ventilation to keep airborne levels to acceptable levels.

Exposure limits:

Chemical Name	ACGH	NIOSH	OSHA
Hexane (contains a mixture of isomers)	50 ppm TWA; Skin potential significant contribution to overall exposure by the cutaneous route	50 ppm TWA; 180 mg/m3 TWA 1100 ppm IDLH	500 ppm TWA; 1800 mg/m3 TWA

OSHA Vacated PELs: Hexane (contains a mixture of isomers): 50 ppm TWA; 180 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respiratory use.

Other Protective Equipment: Make eye bath and emergency shower available.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Appearance: Clear colorless
Odor: Gasoline like
pH: Not available.
Vapor Pressure: 151 mm Hg @ 25°C
Vapor Density: 2.97(Air = 1)
Evaporation Rate: Not available.
Viscosity: 0.31 mPas 20°C
Boiling Point: 62 69°C @ 760 mmHg
Freezing/Melting Point: 95 °C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:0.678
Molecular Formula:C6H14
Molecular Weight:86.18

Material Safety Data Sheet
Instant FAME/Instant Anaerobe Methods
Hexane

SECTON 10 – STABILITY AND REACTIVITY

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, excess heat, electrical sparks, confined spaces.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

SECTION 11 – TOXICOLOGICAL INFORMATION

CAS# 110 54 3: MN9275000
LD50/LC50:
CAS# 110 54 3:
Draize test, rabbit, eye: 10 mg Mild;
Inhalation, mouse: LC50 = 150000 mg/m3/2H;
Inhalation, rat: LC50 = 48000 ppm/4H;
Inhalation, rat: LC50 = 627000 mg/m3/3M;
Oral, rat: LD50 = 25 gm/kg;
Carcinogenicity:
CAS# 110 54 3: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
Epidemiology: Occupational polyneuropathy has resulted from hexane exposures as low as 500 ppm, but the minimum levels of n hexane that are neurotoxic in humans haven't been established. Nearly continuous exposure of animals at 250 ppm has caused neurotoxic effects.
Teratogenicity: No evidence of teratogenicity or embryotoxicity in anmial studies with hexane. Fetotoxicity has been observed in the presence of maternal toxicity.
Reproductive Effects: Severe testicular damage has been observed in rats exposed to hexane at concentrations which have produced other significant toxicity. Although subneurotoxic doses of its principle toxic metabolite, 2,5 hexanedione, can induce progressive testiculartoxicity in rats, there have been no reports of human sterility or other reproductive toxicity associated with n hexane exposures.
Mutagenicity: Positive results (chromosomal damage in the bone marrow cells) obtained for rats exposed by inhalation to n hexane.
Neurotoxicity: n Hexane is a mild irritant and CNS depressant in acute exposure, but its principal effects are damage to the sensory and motor peripheral nerves, particularly in chronic exposure.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity: No data available. Estimated BCF values = 2.24 and 2.89. These values suggest that hexane will show low bioconcentration in aquatic organisms. Estimated Koc value = 4.11. This product will show slight soil mobility and is expected to rapidly volatilize from moist surface soils.
Environmental: Terrestrial: Volatilization and adsorption are expected to be the most important fate processes. Aquatic: Photolysis or hydrolysis are not expected to be important. Atmospheric: Expected to exist entirely in the vapor phase in ambient air, expected half life 2.8 days. Expected to biodegrade but not bioconcentrate.
Physical: No information available.
Other: No information available.

Material Safety Data Sheet
Instant FAME/Instant Anaerobe Methods
Hexane

SECTION 13 – DISPOSAL CONSIDERATIONS

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

SECTION 14 – TRANSPORT INFORMATION

Proper Shipping Name: Hexanes
Hazard Class: 3
UN Number: UN1208
Packing Group: II
Flash Point: 22

SECTION 15 – REGULATORY INFORMATION

US FEDERAL
TSCA
CAS# 110 54 3 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 110 54 3: 5000 lb final RQ; 2270 kg final RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 110 54 3: immediate, delayed, fire.
Section 313
This material contains Hexane (contains a mixture of (CAS# 110 54 3, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Parts 261.3
Clean Air Act:
CAS# 110 54 3 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 110 54 3 can be found on the following state right to know lists: New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
XN F N
Risk Phrases:
R 11 Highly flammable.
R 38 Irritating to skin.
R 48/20 Harmful : danger of serious damage to health by prolonged exposure through inhalation.
R 62 Possible risk of impaired fertility.
R 51/53 Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.
R 65 Harmful: may cause lung damage if swallowed.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:
S 16 Keep away from sources of ignition No smoking.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.
S 36/37 Wear suitable protective clothing and gloves.
S 9 Keep container in a well ventilated place.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.
S 62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

WGK (Water Danger/Protection)
CAS# 110 54 3: 1
Canada - DSL/NDSL
CAS# 110 54 3 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of B2, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 110 54 3 is listed on the Canadian Ingredient Disclosure List.

SECTION 16 – Other Information

This Material Safety Data Sheet has been prepared in accordance with 29 CFR 1910.1200 and contains information believed to be accurate and complete at the date of preparation. The statements contained herein are offered for informational purposes only. MIDI Inc. believes them to be accurate but does not purport to be all inclusive. The above stated product is intended for use only by persons having the necessary technical skills and facilities for handling the product at their discretion and risk. Since conditions and manner of use are outside our control, we (MIDI Inc.) make no warranty of merchantability or any such warranty, express or implied with respect to information and we assume no liability resulting from the above product or its use. Users should make their own investigations to determine suitability of information and product for their particular purposes.

APPENDIX C

FORMS

Pre-Mobilization Safety Briefing

HSE Indoctrination Record

Job Safety Hazard Analysis

Hazard Analysis/Risk Assessment Acknowledgement

Daily Safety Meeting

Incident/Accident Notification

Next of Kin Information

Daily Survey Report

Management of Change Order

CSA INTERNATIONAL, INC.
PRE-MOBILIZATION SAFETY BRIEFING (PMSB)

A PMSB will be conducted by the CSA Site Safety Coordinator

The following is a summary of items to be discussed:

1) Description of project and goals
 - Sediment & Water collection, hydrographic profiler casts, ADCP, ROV Ops
2) Communications – key to acquiring goals
 - Accident prevention - safe and healthy environment
3) Team members, assignments, and shifts
 - CSA, ENTRIX, and M/V Green Provider crew
4) Coordination with boat driver/vessel's crew
 - Efficient procedures
 - Emergencies - medical, fire, man overboard (MOB), abandon ship
5) Designation of person in charge on deck
 - Shift leader
6) Complexity of the operations
 - Mobilization, Field, Demobilization
 - Collection Processes
7) Pre-operation checks
 - Vessel preparation
 - Location of vessel safety equipment
8) Safety equipment
 - Vessel
 - Sampling
 - First-aid
9) Hazards
 - Vessel operations
 - Sampling operations
 - Vessel and equipment: slips, trips, falls, bumps, pinching;
10) Limitations of personnel and equipment
 - Lifting, rigging, and safe working loads
 - Personal protective equipment
11) Environmental conditions
 - Wind, sea state, etc.

The PMSB/HSE induction for all personnel involved with the field activities will be conducted prior to vessel mobilization. Daily briefings will be conducted for survey personnel. All vessel crew members will be briefed on the operation of all primary and support equipment and primary sampling equipment (especially the winch, blocks, cable, and A-frame) prior to mobilization. It is the responsibility of the survey team members to ensure that proper rigging and lifting procedures are used. The vessels' Masters will be responsible for conducting the following drills: MOB, fire, abandon ship, and medical emergency. These drills will be conducted once before the survey begins and weekly thereafter.

CSA INTERNATIONAL, INC.

HEALTH, SAFETY, AND ENVIRONMENTAL INDOCTRINATION RECORD

Name:

Date:

Employer:

I have received indoctrination and training for following:

1. Company safety policies of CSA, ENTRIX, and CML safety requirements, and the names of persons assigned to safety supervision duties.
2. Requirements and my individual responsibilities for accident prevention, maintaining a safe and healthy work environment, preventing damage to property, and protecting safety of others.
3. Provisions for medical facilities and procedures for reporting or correcting unsafe conditions and practices, and reporting accidents.
4. Job hazards and means used to control or eliminate those hazards, including applicable "Job Safety Analyses (JSA)" (major activity, locations, hazards, controls).
5. Accident Reporting - Both my individual and my Supervisor's responsibilities for reporting all accidents, even minor.
6. Sanitation - Water, toilet facilities.
7. Medical Facilities - Location of nearest medical emergency facilities, emergency phone numbers, first-aid kits and material data safety sheets.
8. Emergency Plans – man overboard, fire, medical, severe weather, spill response, and other emergency procedures.
9. Personal protective equipment.
10. Daily housekeeping requirements.
11. Fire prevention.
12. Policy on use of ropes, slings, and chains.

13. Hazards of floor and wall openings.
14. Hearing protection.
15. Requirements when working around hot substances.
16. Precautions with welding, cutting, and grounding of machinery.
17. Temporary electrical requirements.
18. Proper use of hand tools and power tools.
19. Proper precautions with compressed gas cylinders.
20. Requirements for ramps, runways, platforms, and scaffolds.
21. Clear access and ladder safety.
22. Material handling, storage, and disposal.
23. Hazardous materials.
24. If I am injured I (do) (do not) want the following person notified:

Name:

Phone:

Signature: _____ Date _____

Safety Officer Signature: _____ Date _____



CSA INTERNATIONAL, INC.

JOB SAFETY HAZARD ANALYSIS FORM

JOB TITLE:	**JSHA No.____**	**Page___of___**	**DATE**: **New___** **Revised___**
Employer: **Facility**: **Location**:	**Classification(s) Doing Job**: **Supervisor**:	**Required /Recommended Personal Protective Equipment**:	**Analysis by**: **Reviewed by**: **Approved by**:

Sequence of Basic Job Steps	Potential Hazards	Recommended Action or Procedure



CSA INTERNATIONAL, INC.

HAZARDS ANALYSIS/RISK ASSESSMENT ACKNOWLEDGEMENT

My supervisor has reviewed this hazard analysis with me, and I understand the hazards and required precautionary actions. I will follow the requirements of this hazard analysis or notify my supervisor if I am unable to do so. I understand that there are Environmental, Safety, and Health professionals on staff if I need further assistance or clarification.

Name (please print)	Signature	Date



CSA INTERNATIONAL, INC.

DAILY SAFETY MEETING FORM

DATE:

PROJECT TITLE:_____

CONDUCTED BY:_____

IN ATTENDANCE: **Print Name** **Sign Name**

SUBJECT(S) DISCUSSED: **Potential Safety Hazards and Resolutions**

INCIDENT/ACCIDENT NOTIFICATION FORM Directions for filling out form

Email within 24 hrs to Lynwood Powell, CSA Stuart Office lpowell@conshelf.com

Originators Reference No: *Number assigned by project/asset as in its incident summary*		
Date of Incident:	**Time:**	**Exact Location**: **Location of the incident/Project Group**
Name of Person(s) involved: *Injured party, any other people involved*		
Employing Company: *Injured party and all people involved*		
Type of Incident: *LTI, Near Miss, RWC, Medical Treatment, etc.*		
Initial Potential Consequence: *Assign initial potential consequence as per The Risk Assessment Matrix*		
Description of Incident:	Where, when, what, how, who, operation in progress at the time (only factual)	

Provide details of the incident including:

- *timing,*
- *order of events,*
- *Personnel involved their position, company, etc.*
- *their role in the incident,*
- *any relevant information available at the time of reporting*
- *medical/emergency response details*
- *any other important information*

Immediate Action:	Immediate remedial action and actions to prevent reoccurrence or escalation

In this section provide only immediate remedial actions (corrective) and actions TO PREVENT REOCCURRENCE. Do not include medical response into this section

Remedial Actions:

Provide long term remedial actions (if identified at the stage of reporting). For the incidents requiring further investigation do not include remedial actions. Those will have to be reported as a part of a final investigation report

Name: **Title:** **Date:**

Signature:

CSA International, Inc.

INCIDENT NOTIFICATION FORM

E-mail/Fax within 24 hrs to – Lynwood Powell, CSA Stuart Office – lpowell@conshelf.com

Originators Reference No:		**Project/Asset Group:**
Date of Incident:	**Time:**	**Exact Location**:
Client/Employing Company:		
Type of Incident:		
Initial Potential Consequence:		
Description of Incident: Where, when, what, how, who, and the operation in progress at the time (only factual).		
Immediate Action: Immediate remedial action and actions to prevent reoccurrence or escalation.		
Remedial Actions:		

Name: **Title:** **Date:**

Signature:

CSA International, Inc.

NEXT-OF-KIN INFORMATION

Person	Name	Relationship	Phone
Bruce Graham	[redacted]	[redacted]	[redacted]
Frank Johnson			
Tony Wadley			
Terry Stevens			



CSA INTERNATIONAL, INC.
DAILY SURVEY REPORT

Client: ENTRIX
Project: Water Column Profiling Survey
Location: GOM; MC Block 252
Job Number: CSA-2290
Date:

Vessel: M/V Green Provider
Client Rep:
Current location:
Satellite Phone #:
Onboard Email:

Weather Report

Wind speed/dir:
Wave height:
General:

PERSONNEL ON BOARD

CSA	*Client*	*Vessel*

CSA INTERNATIONAL, INC.
Daily Survey Report (*Cont'd*)

SAMPLE SUMMARY

Total Stations:		Total Stations:	
# Complete:	0	# Complete:	0
% Complete:	0.00%	% Complete:	0.00%

DAILY ACTIVITIES LOG

Time	*Description*

SUMMARY OF PROJECT TIME

Operation	*today*	*previous total*	*Total*
Mob/Demob			0
Operations			0
Standby Weather			0
Standby Other			0
Standby in Port			0
Standby Client			0
Technical Downtime			0
Vessel Downtime			0
Maintenance Time			0
TOTAL	0	0	**0**

CSA INTERNATIONAL, INC.
Daily Survey Report (*Cont'd*)

PLANNED ACTIVITY FOR NEXT 24 HOURS

ACCIDENTS/INCIDENTS

HAZARDS REPORTS

AUDITS COMPLETED

SIGHTINGS OF/INTERACTIONS WITH FISHERMEN

EMERGENCY DRILLS COMPLETED

HSE ISSUES/CONCERNS

MARINE MAMMAL/SEA TURTLE SIGHTINGS

CURRENT ESTIMATE OF COMPLETION DATE

CSA INTERNATIONAL, INC.
Daily Survey Report (*Cont'd*)

MONTHLY EVENTS

Event	*Quantity*
Number of Fatalities	
Number of Lost Time Injuries	
Number of Restricted Work Injuries	
Number of Medial Treatment Injuries	
Number of First Aid Injuries	
Number of Fires and Explosions	
Number Incidents involving Equipment Damage	
Number of Near Misses	
Number of Spills (to sea or land)	
Number of Security Incidents	
Number of hazard reports /STOP cards or safety observations	
Number of incidents involving stakeholder complaints	
Amount of waste generated, categorized by type. (monthly only)	
Amount of fuel oil / diesel used	

At the completion of the survey a report on injury absences and details of ongoing HSE Programs/Initiatives will be completed.

CSA INTERNATIONAL, INC.

Management of Change Order

Date:

To:

Subject:

Comments:

Project Change	Reason for Change

Approved by:

CSA Project Manager

Client Representative

ATTACHMENTS

An Industrial Hygiene (IH) Technician equipped with air monitoring equipment including, but not limited to, an Ultrarae to sample for benzene and a Multirae to continuous sample continuously for VOCs, LEL, H2S and CO, will be aboard the vessel to monitor air quality during the effort. The IH technician will inform the boat crew and the vessel will re-position, if the air quality meets or exceeds the following:

Compound	**Threshold**
Benzene	0.5 ppm
VOCs	50 ppm
H2S	5 ppm
LEL	10%
CO	15 ppm

Use your NOAA or Program's letterhead HERE

Final Cruise Instructions

Date Submitted: My 20, 2010

Platform: NOAA Ship *Gordon Gunter*

Cruise Number: GU-10-02

Project Title: Vertical and Horizontal Characterization of the Oil Plume

Cruise Dates: 02 April – 30 May 2010

Prepared by: Dated:
Chief Scientist Name
Chief Scientist
Affiliation (Program or Lab)

Approved by: Dated: _____
Program Director Name
Title
Affiliation (Program or Lab)

Approved by: Dated: _____
Lab Director Name
Title
Affiliation (Program or Lab)

Approved by: Dated: ___
Captain Michael S. Devany, NOAA
Commanding Officer
Marine Operations Center - Atlantic

Document ID: 0.7.45.16396

Commanding Officer
NOAA Ship *Gordon Gunter*

CRUISE INSTRUCTIONS
NOAA Ship *Gordon Gunter* Cruise GU-10-02

I. Overview

A. Cruise Period: May 25, 2010 – June 10, 2010

B. Operating Area: Gulf of Mexico – Boundaries of the oil wellhead and within the loop current

C. Summary of Objectives:

1. ***Primary Objectives***
 a. Characterize the vertical and horizontal characteristics of subsurface oil near the oil wellhead and within the loop current.
 b. Identify changes in oil characteristics and transport of the oil plume.
 c. Collect water samples to confirm the acoustic backscatter profile from the EK-60 are oil patches.
 d. Assess the occurrence, abundance and distribution of the early life stages of spawning fish in the boundary areas around the oil plume.
2. ***Secondary Objectives***
 a. Assess bluefin tuna larval abundance and distribution within the loop current, in relation to the oil plume.

D. Participating Institutions:
National Marine Fisheries Service- Pascagoula Laboratory, Miami Laboratory
University of New Hampshire

E. Personnel (Science Party)

Name	Title	Sex	Organization	Citizenship
LEG 1 (May 25 – June 10, 2010)				
TBD				

F. Administrative:

1. Points of Contact:
 Field Party Chief: TBD
 Operations Officer: LT Kent Stein/ ENS Adrienne Hopper; NOAA Ship *Gordon Gunter*, 151 Watts Ave, Pascagoula, MS 39567; (228)327-7905; OPS.Gordon.Gunter@noaa.gov

2. Diplomatic Clearances: No diplomatic clearances are required.

Document ID: 0.7.45.16396

3. Licenses and Permits:
This cruise will be conducted under the following permits:
Florida State Permit, Alabama State Permit, Mississippi State Permit, Louisiana State Permit, Texas State Permit, Southeast NMFS Regional Permit, Sea Turtle Permit, Marine Mammal Permit

II. Operations

A. Cruise Plan/Itinerary:
Itinerary:

Leg	Date	Location
1	May 25, 2010	Depart Pascagoula, MS
	June 10, 2010	Arrive Pascagoula, MS

B. Staging and Destaging: PASCAGOULA/PASCAGOULA

C. Operations to be conducted:
Operational Plans:

NOAA Ship *Gordon Gunter* will depart Pascagoula, Mississippi on May 25, 2010 to conduct a survey to characterize the vertical and horizontal characteristics of the oil plume. The 16-day cruise will be conducted in one Leg.

NOAA Ship *Gordon Gunter* will collect acoustic backscatter profiles on the oil plume using the EK-60. It is anticipated that characteristic signatures of subsurface plumes can be identified at frequencies <30 kHz. Validation of the acoustic backscatter profiles will be conducted using water samples from Niskin bottles sampling at the depth of the backscatter profiles. A CTD may be deployed to collect water samples, vertical temperature profiles, and other relevant environmental information if damage to the sensors can be determined not to occur in oiled waters. If a CTD cannot be deployed, water samples will be taken with separate Niskin bottles.

Sampling with the EK-60 will be conducted using line transects beginning about 2 km from the oil wellhead and conducted in a 360 degree arc around the well to allow tracking of oil in all directions from the source. Transects will continue until the edges of the plume are identified and should be continued slightly past the edge of the plume to provide a picture of unperturbed vs. perturbed environments. If plumes of higher oil concentrations are observed, sampling will be conducted to attempt to follow these plumes beyond the search area, if necessary. At a minimum, five transects will be conducted and Niskin water bottle and/or CTD samples will be taken every 15 miles on each transect. MOCNESS tows will be conducted at the same stations as water samples.

Upon completion of the characterization of subsurface oil plumes, adaptive sampling for bluefin tuna larvae will be conducted within the loop current, and, in particular, in areas identified as having subsurface oil. Satellite imagery and acoustic backscatter profiles will be used to identify ichthyoplankton stations based upon a current larval bluefin habitat model. These stations will be sent to the ship along with the satellite imagery each day. Each station will

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consist of a CTD to 500 meters, a 10 minute subsurface neuston tow using the 505 mesh net, and a standard 10 minute neuston tow. The subsurface nesuton net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. This pattern will be repeated for 10 minutes. Flow meter reading will be recorded for the tow. At selected stations the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. All samples will be preserved in 95% ethanol in accordance with standard SEAMAP protocols

Communication between the ichthyoplankton team and the bridge on station will be accomplished via hand held radios. During rough weather, the watch leader with consultation from the ship's crew will determine if all sampling gear can be deployed safely. The Field Party Chief should be notified of any delays to sampling due to mechanical, medical or weather issues as well. The Chief Engineer should also be made aware of expected time of arrival at the first station so the salt water pumps can be turned on and ready for net washdown.

STATION OPERATIONS

At the Bridge's 10 minute warning, scientists and deck personnel will proceed to duty stations and prepare for station. Scientists and deck personnel should be ready and standing by for bridge's call that the ship is on station and ready to proceed.

SEAMAP CTD Profiles

The CTD unit with the SBE 32 water carousel with three Niskin bottles will be deployed to just below the surface of the water when all areas are ready. When at the surface, the lab scientist will start the CTD recording. The sampler must then remain submerged for 3 minutes at the surface for the temperature gauge to adjust to the water temperature after sitting on deck between stations. After the 3 minute soak period the CTD will be lowered to the depth of the acoustic backscatter profile. After the cast, the CTD is carefully set on deck, taking care not to jar the sensitive electronics. We request the Electronics Technician periodically clear the y-connections throughout the cruise. The CTD must be cleaned of any oily residue following each station and sensors should be examined for any damage due to oil immersion.

Niskin Bottles

If a CTD cannot be used due to damage to the sensors from oil immersion, water samples will be collected using separate Niskin bottles. The Niskin bottles will be lowered to the depth of the acoustic backscatter profile and samples collected at depths determined by the profile.

Neuston Sampling

The neuston net is a 1 x 2 m frame outfitted with a 505 mm mesh net. Each neuston tow will be conducted for 10 minutes. The neuston net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. If necessary, the ship should steam forward in a wide arc to keep the neuston net (mouth opening) out of the influence of the prop wash. The duration of a neuston tow may be shortened up to five minutes when there are high concentrations of jellyfish, ctenophores, Sargassum, floating weed and/or debris. After retrieval, plankton is rinsed into cod end with seawater while net hangs over side (if windy, watch leader may request net to be brought directly on board and rinsed on deck). Samples will be preserved in 95% ETOH initially and transferred to new 95% ETOH after 24 hours.

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1 m MOCNESS Sampling

The Southeast Fisheries Science Center (SEFSC) will provide the 1 m MOCNESS and associated electronic equipment to record the environmental data. The MOCNESS will be deployed from the stern with the MOCNESS winch at the same location as the CTD or Niskin bottle collections. Prior to deployment, the ship speed should be maintained at 2 kt. However, once the MOCNESS is lowered into the water, the props should be disengaged to avoid damage by the ship's prop wash. The props can be reengaged once the watch leader has relayed to the bridge that the nets are at a safe depth. Once deployed, a series of 9 nets (0.505 mm mesh) can be opened independently at specific depths to obtain a discrete sample of that depth. For the oil plume characterization survey, depths will be determined based on the acoustic backscatter profile obtained by the EK-60. For the bluefin tuna larval survey, the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. The depth may be modified depending on the acoustic backscatter profile at the sampling station. Winch and ship speed will be manipulated by the watch leader through communication with the deck and bridge in order to filter a target volume of 250 m^3 for each net. The watch leader will let the bridge know when to disengage the props as the nets reach the surface during retrieval. After retrieval, samples will be rinsed into cod ends with seawater before bringing the MOCNESS on deck. Each oblique sample (surface to maximum depth) will be initially preserved in 10% formalin and transferred to 95% ETOH after 36 hours. The remaining nets will be initially preserved in 95% ETOH and transferred to fresh 95% ETOH after 24 hours.

D. Dive Plan: N/A

E. Applicable Restrictions: N/A

III. Equipment

A. Equipment and Capabilities Provided by the Ship:

1. Because of the importance of the CTD equipment package to record environmental data and the need for the Scientific Computing System (SCS) to populate the Fishery Scientific Computing System (FSCS), an Electronics Technician is imperative.
2. Hydrographic winch with wire and meter readout to accomplish CTD/bottle cast. Spare slip rings for each winch. Fully functional wire readouts for each winch.
3. ADCP
4. One (1) Primary SBE 9plus CTD configured as follows;
 a. Unit should be mounted horizontally and mounted in the water sampling frame. The frame should be examined to ensure it is in good physical condition and there are no breaks present in any of the welds supporting the frame.
 b. The standard 12 position SBE 32 Carousel should be properly mounted in the water sampler section of the frame and tested to ensure that all 12 bottle positions are working properly and respond to software requests for firing.
 c. The internal Digiquartz pressure sensor should be in good working order and have a calibration/service date not to exceed 365 days.
 d. The primary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 i. One (1) SBE 3 Premium Temperature sensor
 ii. One (1) SBE 4 Conductivity sensor
 iii. One (1) SBE 43 Dissolved Oxygen sensor
 iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
 v. One (1) Wetlabs Wetstar pumped fluorometer
 vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
 vii. One (1) Wetlabs C-Star transmissometer
 viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.
 e. The secondary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 i. One (1) SBE 3 Premium Temperature sensor
 ii. One (1) SBE 4 Conductivity sensor
 iii. One (1) SBE 43 Dissolved Oxygen sensor
 iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
 v. One (1) Wetlabs Wetstar pumped fluorometer
 vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.

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vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

f. The unit should be properly terminated and connected to a properly functioning SBE 11 Deck Unit. The deck unit should be connected to allow the following:
i. Proper control of the SBE Water Sampler Carousel via the SEASAVE application.
ii. Integration of a proper NMEA signal from a GPS unit.

7. A second SBE 9plus profiler should be available as well. Unit does not have to be configured as a complete functioning ready-to-install on the sea cable unit; however, it should have the following components available:
a. Sensors for a Primary suite (with a calibration date as recent as possible, not to exceed 365 days):
i. One (1) SBE 3 Premium Temperature sensor
ii. One (1) SBE 4 Conductivity sensor
iii. One (1) SBE 43 Dissolved Oxygen sensor
iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
v. One (1) Wetlabs Wetstar pumped fluorometer
vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

b. Sensors for a complete Secondary suite (with a calibration date as recent as possible, not to exceed 365 days):
i. One (1) SBE 3 Premium Temperature sensor
ii. One (1) SBE 4 Conductivity sensor
iii. One (1) SBE 43 Dissolved Oxygen sensor
iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
v. One (1) Wetlabs Wetstar pumped fluorometer
vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

8. A second SBE 11 Deck Unit should be on the ship to be put into service if needed.
9. It is highly desirable to have the following additional spare sensors on-board if possible:
a. One (1) SBE 43 DO Sensor

b. One (1) SBE 3 Temperature Sensor
c. One (1) SBE 4 Conductivity Sensor
d. One (1) Wetlabs Wetstar pumped fluorometer
e. One (1) Wetlabs C-Star Transmissometer
f. One (1) SBE 5T Pump

15. Copies of all calibration sheets for CTD profilers, TSG, and spare sensors should be provided to the laboratories' Shipboard System Specialist prior to sailing.
16. CTD capable winch and J-frame for CTD casts, with sufficient electromechanical cable for casts to 500 m.
17. NMEA GPS input to CTD header file.

<u>The following data are requested of the SCS</u>

The SCS system should be fully operational for the duration of the survey. A listing of any sensors that will not be functional for the survey should be provided prior to sailing to the Field Party Chief, taking into consideration that event templates will have to be checked by the Shipboard System Specialists to ensure there will be no impact or an alternative sensor can be selected.

1. NorthStar 952X
 a. UTC time
 b. Latitude
 c. Longitude
 d. Speed over ground
 e. Course over ground
2. Furuno GP-90 GPS
 a. Latitude
 b. Longitude
 c. Speed over ground
 d. Course over ground
3. Sperry speed log
 a. Speed through the water
 b. Speed over ground
4. EQ50 and EK60 depth in meters
5. Gyro-heading
6. Air temperature (°C)
7. Corrected barometric pressure
8. True wind speed
9. True wind direction
10. SIMRAD ITI Trawl System (Temperature and Depth only)
11. Information should be passed to the Rotating ET to ensure the following:
 a. The Automatic Logger Control on the SCS Server must be enabled anytime ACQ is started and should use the default of 0:00:00 (Midnight GMT).
 b. The contents of the Eventdata folder should be allowed to remain present for the duration of the survey (they should not be deleted between legs). This will ensure that event IDs do not restart for the respective events

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during the survey.

SEASAVE SOFTWARE

Prior to sailing, the proper .CON files should be built in SEASAVE. The software should be set to look for the proper .CON file for the respective instrument.

It is also highly desirable that the ASCII Out function be allowed to feed CTD data into SCS via serial cable.

B. Equipment and Capabilities Provided by the Scientists:

Mississippi Laboratory

1. Flowmeters (6)
2. 1 m MOCNESS frame, (9) 0.505 mm nets, and electronic equipment
3. Conducting wire (5/8-in) and corresponding block for MOCNESS tows
4. Plankton sampling supplies box
5. Plankton preserving jars, lids and labels
6. Turner Designs 10-AU benchtop Fluorometer
7. Chemical transfer pumps
8. Formalin and ethyl alcohol
9. Triton (R) X-100
10. Methanol and filters
11. 6 Niskin bottles
12. 4 Garden hoses for washing down nets, nozzles, and hose repair parts
13. Plankton transfer table
14. 5 gallon buckets
15. Various clerical supplies
16. SIMRAD ITI Temperature/Depth Sensor
17. Spare batteries for the SBE 19 Seacat profilers

IV. Hazardous Materials

A. Policy and Compliance:

The Field Party Chief shall be responsible for complying with MOCDOC 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for Visiting Scientists, released July 2002. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemicals brought aboard. The amount of hazardous material arriving and leaving the vessel shall be accounted for by the Field Party Chief.

B. Radioactive Isotopes: N/A

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C. Inventory:
Expected hazardous materials to be brought on board for this cruise are:
Ethanol - four 33 gallon drums
Formalin - one 33 gallon drum
Methanol - eight 1 gallon jugs
Triton-X - one 2-gallon carboy

V. Additional Projects

A. Supplementary ("Piggyback") Projects: N/A

B. NOAA Fleet Ancillary Projects: N/A

VI. Disposition of Data and Reports

A. Data Responsibilities:
The Field Party Chief is responsible for submission of a ROSCOP II form (NOAA, Form 2423) to the National Oceanographic Data Center within 30 days after cruise termination.

B. Pre and Post Cruise Meeting:
Pre-Cruise Meeting: On the ship prior to departure, the Field Party Chief will conduct a meeting of the scientific party to train them in sample collection and inform them of cruise objectives. Some vessel protocols, e.g., meals, etiquette, etc. will be presented by the ship's Operations Officer.

Post-Cruise Meeting: If need be, upon completion of the cruise, a post-cruise meeting will be held and attended by the ship's officers, the Field Party Chief and members of the scientific party, the Vessel Coordinator, and the Port Captain to review the cruise. Concerns regarding safety, efficiency and suggestions for improvement for future cruises should be discussed. Minutes of the post-cruise meeting will be taken by the Pascagoula Port Captain and distributed to all participants with e-mail to the CO.MOC.Atlantic@noaa.gov and ChiefOps.MOA@noaa.gov . A cruise report will be prepared by the Field Party Chief and submitted to the Director, SEFSC, within 30 days after the cruise is completed.

C. Ship Operation Evaluation Report:
Within seven days of the completion of the cruise, a Ship Operation Evaluation form is to be completed by the Field Party Chief. The preferred method of transmittal of this form is via email to OMAO.Customer.Satisfation@noaa.gov . If email is not an option, a hard copy may be forwarded to:

Director, NOAA Marine and Aviation Operations
NOAA Office of Marine and Aviation Operations
8403 Colesville Road, Suite 500
Silver Spring, MD 20910

A file copy of each completed evaluation form will be sent to the SEFSC Mississippi Laboratory Director and the SEFSC Vessel Coordinator.

VII. Miscellaneous

A. Meals and Berthing:

Meals and berthing are required for up to 15 scientists. Meals will be served three times daily beginning one hour before scheduled departure, extending throughout the cruise, and ending two hours after the termination of the cruise. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the survey (e.g., Field Party Chief is allergic to fin fish).

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Field Party Chief. The Field Party Chief and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Field Party Chief is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Field Party Chief is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Field Party Chief will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Field Party Chief to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts:

The NOAA Health Services Questionnaire (NHSQ, Revised: 08/08) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Field Party Chief or the NOAA website at
http://www.omao.noaa.gov/medical/NHSQ_Final_wi_Instructions_fill.pdf

The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The participant can mail, fax, or scan the form into an email using the contact information below. The NHSQ should reach the Health Services Office no later than four weeks prior to the cruise to allow time for the participant to obtain and submit additional information that health services might require before clearance to sail can be

granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the form, and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.
Contact information:
Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757.441.6320
Fax 757.441.3760
E-mail MOA.Health.Services@noaa.gov

Prior to departure, the Field Party Chief must provide a listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: name, address, relationship to member, and telephone number.

C. Shipboard Safety:
Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required

D. Communications:
A progress report on operations prepared by the Field Party Chief may be relayed to the program office. Sometimes it is necessary for the Field Party Chief to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Field Party Chief upon request, in order to conduct official business. Due to a new directive from Marine Operations Center, the ship must charge the science party for all calls made on the cell or sky-cell telephone. INMARSAT, Sky Cell and cellular communication costs shall be reimbursed to the ship for telephone calls made by all scientific personnel. Currently, Sky Cell and cellular telephone services are about $0.89 per minute and INMARSAT Mini-M is around $1.68 per minute for voice. These charges will be assessed against the program after the ship receives the bill. There is generally a three-month delay receiving the bill for review. The Field Party Chief will be required to keep a log of all calls made by the science party. Communication between the bridge, the dry lab, and the deck during plankton operations will be by VHS radio. We request 30 minute and 10 minute notification prior to arriving at stations.

E. IT Security:
Any computer that will be hooked into the ship's network must comply with the NMAO Fleet IT Security Policy prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is preferable. Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms:
Foreign National Access and Deemed Export Controls
All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (http://deemedexports.noaa.gov). National Marine Fisheries Service personnel will use the Foreign National Registration System (FRNS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated NMFS Deemed Exports point of contact to assist with the process (http://deemedexports.noaa.gov/contacts.html).
The following are basic requirements. Full compliance with NAO 207-12 is required.

Responsibilities of the Field Party Chief:

1. Provide the Commanding Officer with the e-mail generated by the FRNS granting approval for the foreign national guest's visit. This e-mail will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Field Party Chief is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.
4. Export Control - *The NEFSC currently neither possesses nor utilizes technologies that are subject to Export Administration Regulations (EAR).*

The Commanding Officer and the Field Party Chief will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written NMAO approval and compliance with export and sanction regulations.
3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Field Party Chief or the DSN of the FRNS e-mail granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the cruise, provide the Field Party Chief with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Field Party Chief of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Field Party Chief can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Field Party Chief will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.

Responsibilities of the Foreign National Sponsor:

1. Export Control - The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.

2. The DSN of the foreign national shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen, NOAA (or DOC) employee. According to DOC/OSY, this requirement cannot be altered.
3. Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National Guest) as required by NAO 207-12 Section 5.03.h.

Received(Date): Fri, 21 May 2010 12:08:56 -0400
From: "Hogarth, Bill" <billhogarth@usf.edu>
Subject: FW: Draft Joint Science Plan
To: "'Roy.Crabtree@noaa.gov'" <Roy.Crabtree@noaa.gov>
Subsurface Plume Decetion Mission [Compatibility Mode].pdf
Proposed Cruise Activities_next version.doc

fyi

Bill Hogarth
Dean, College of Marine Science
University of South Florida
140 Seventh Avenue South, KRC3109
St. Petersburg, FL 33701
Phone: 727-553-3542
Fax: 727-553-3968
email: billhogarth@usf.edu

-----Original Message-----
From: Steve Murawski [mailto:Steve.Murawski@noaa.gov]
Sent: Friday, May 21, 2010 7:50 AM
To: Peebles, Ernst; Hogarth, Bill; scholin@mbari.org; larry@ccom.unh.edu; Bonnie Ponwith; Philip M Kenul
Subject: Draft Joint Science Plan

All,

Thanks you for your hard work (so far) in getting this cruise plan (s) together so repidly. I do not think we have had everyone on the same call at the same time yet and I am thinking we should do so sometime very soon (this afternoon)? I am attaching some preliminary documents trying to put the pieces. These are draft materials and open for comments and corrections and are based on our (Bonnie Ponwith and me) limited conversations with you all. Please send comments back to the group.

The two documents were submitted to the Incident Command center as a funding proposal. One issue is, of course, that if we are successful with the proof of concept I think its likely that we'll want to extend, so we have options for a 7 and 16 day plan.

I would like to work especially on two elements (1) joint science dialog among our lead project scientists - so we are all executing the same game plan, and (2) a joing communications plan - so we have integrated messages. This is a very big deal and we stand to look very good if we are pulling together. Please ID each of those individuals so we can get on both issues. We can discuss further on a call.

Thanls everyone, I can tell you that we at NOAA are very excited to be contributing to this effort

Steve Murawski & Bonnie Ponwith

Characterizing the Extent of Sub-surface Oil and Dispersants DWH Incident

Critical Partnerships -
NOAA, Academia, Industry



Cruise Objectives

- Map the 3-Dimensional Structure of the "plume" of sub-surface oil and dispersants and characterize the rates and directions of flows including the possibility of entrainment into the "Loop Current".

- Inter- calibrate multiple sensing technologies to attain a high degree of reliability of detection and differentiation of various sources of "back-scatter" (e.g., oil/dispersants from normal "biologics")

- Sample sub-surface biological communities to help understand the potential impacts of sub-surface oil and dispersants on affected ecosystems



Collaborators

- NOAA –Office of Marine and Aviation Operations, Southeast Fisheries Science Center, Office of Response and Restoration
- University of South Florida, School of Marine Sciences
- Monterey Bay Aquarium Research Institute
- University of New Hampshire – Center for Ocean and Coastal Mapping and Joint Hydrographic Center

Assets in Use

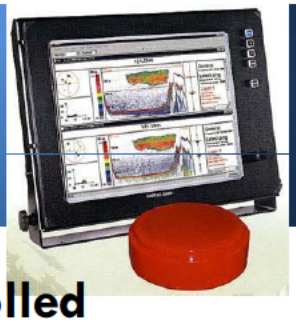


NOAA Fishery Survey Vessel (FSV) GORDON GUNTER
Run EK-60 sonar for broad scale plume mapping, deploy MOCNESS Net, Standard bottle sampling deploy MBARI "Gulper" AUV



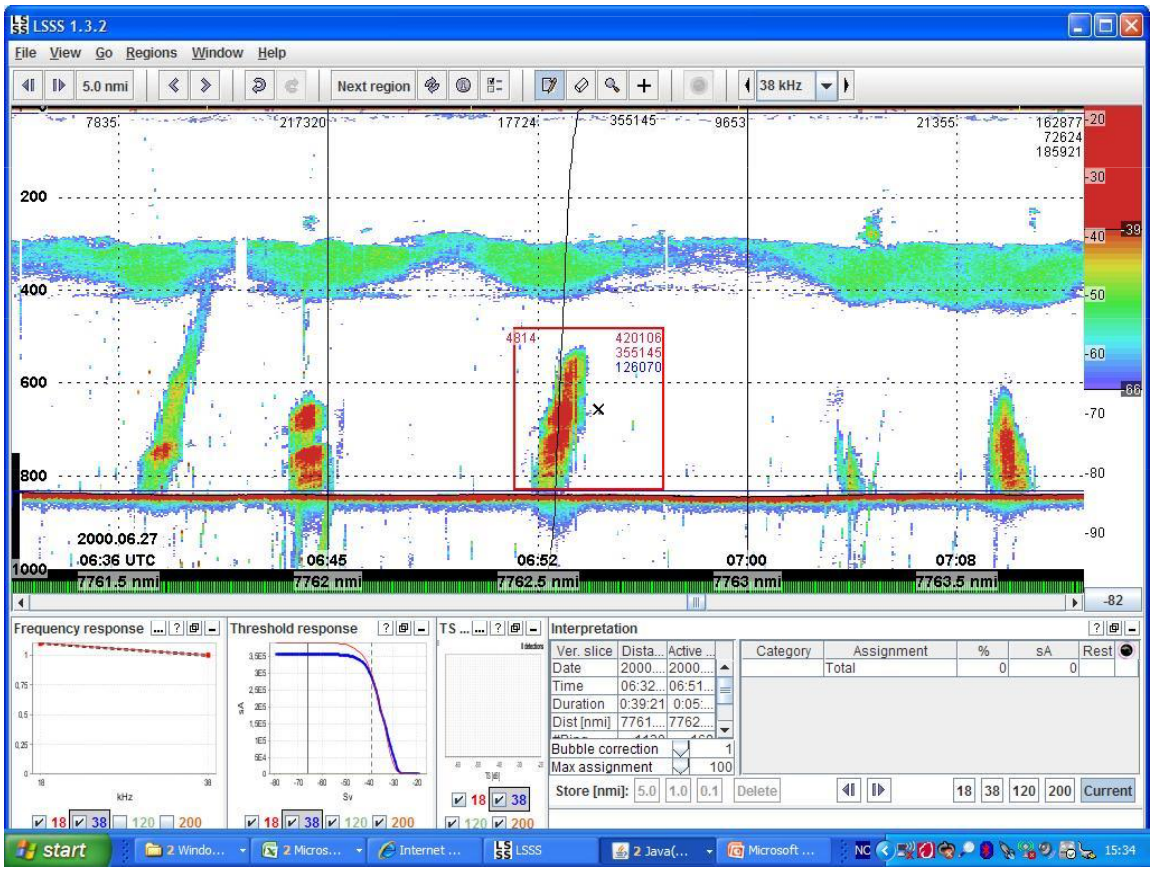
Hydrocast/shiptek bottle sampling at depth, deploy flurometer, Glider release, bottom trawling

Broad Scale Plume Detection - Sonar

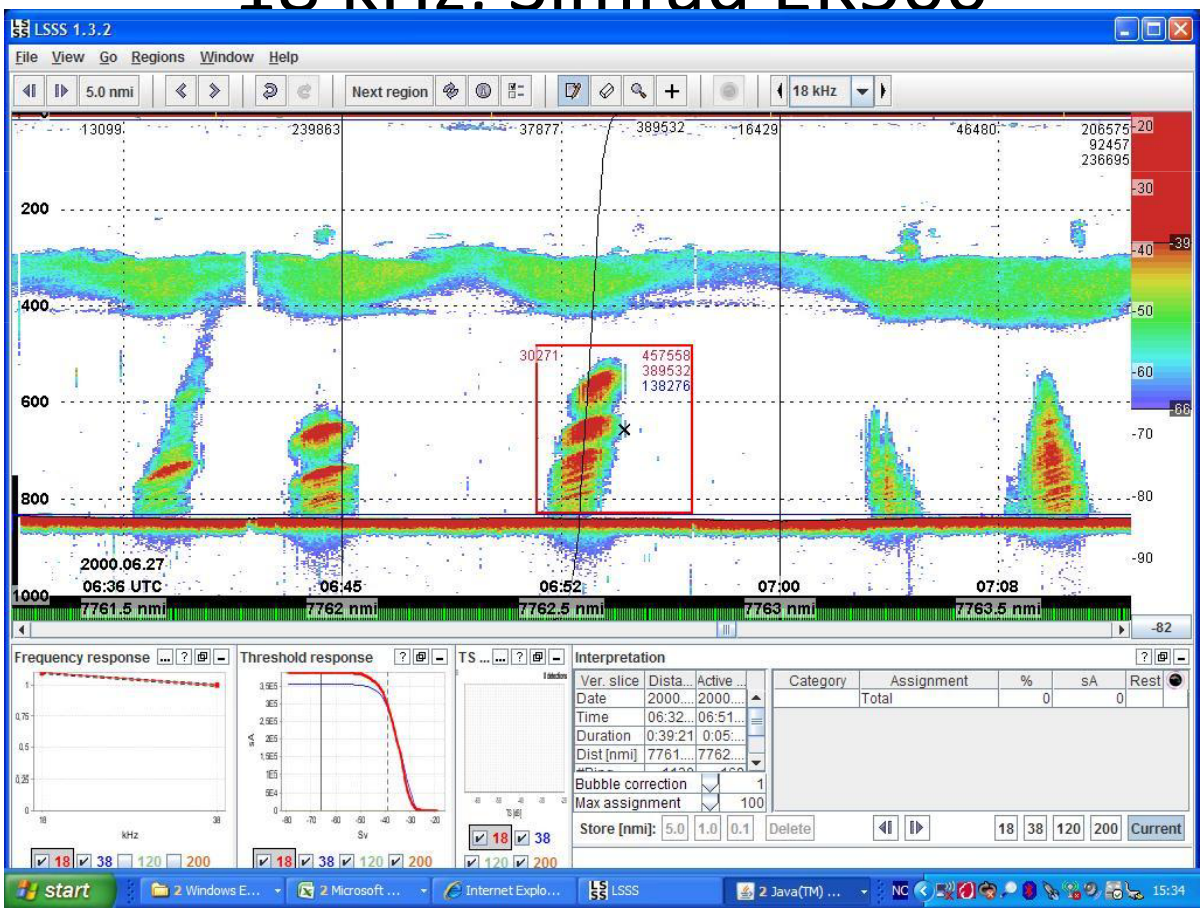


- In June 2000 the Norwegians **initiated a controlled release of oil and gas at >800 meters water depth.** Proved the utility of using 18 and 38 khz mapping sonars for tracking the released particles
- The FSV GUNTER has the EK-60 SIMRAD sonar package, UNH-Joint Hydrographic Center will process transect data in real time onboard and produce three dimensional maps of back-scatter density distribution
- Sampling will be adaptive to identify the vector direction and density of identified "plumes" at depth

Norwegian Experiment 38 kHz, Simrad EK500



18 kHz. Simrad EK500



To help calibrate sonar, need *in situ* water sampling and other sensing (fluorometry)

1500 meter version Instrument Payload – The Gulper

1. 2 SBE25 boardsets
2. 2 SBE3 Temp Sensors
3. 2 SBE4 Conductivity Sensors
4. Paroscientific Pressure Sensor (UCB4000)
5. SBE43 Dissolved Oxygen (O_2 measurements at depth)
6. HobiLabs Hydroscat 2 (flurometer)
7. WetLabs ECO-CDOM Puck fluorometer
8. 10 – 1.8 liter water samplers (the “Gulper”)

Supplemented with Niskin bottle rosette aboard GUNTER

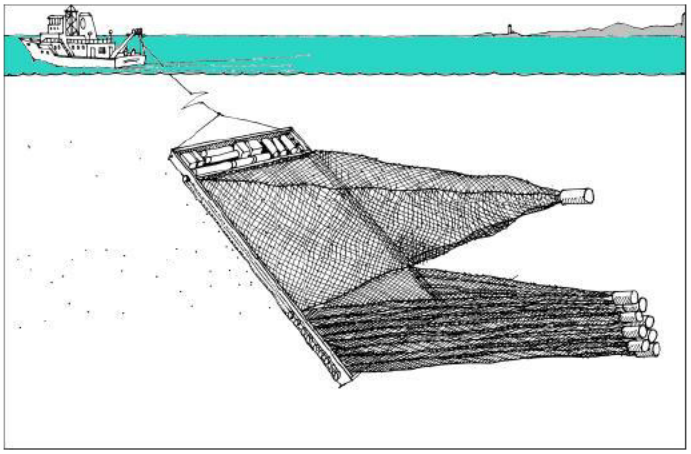

MBARI Upper Ocean AUV


Water Sampler
Midsection 10
separate samples



"Gulper" Requires a knuckle crane to deploy/ retrieve – highly Likely the crane aboard GUNTER is compatible

Ecological Effects Sampling



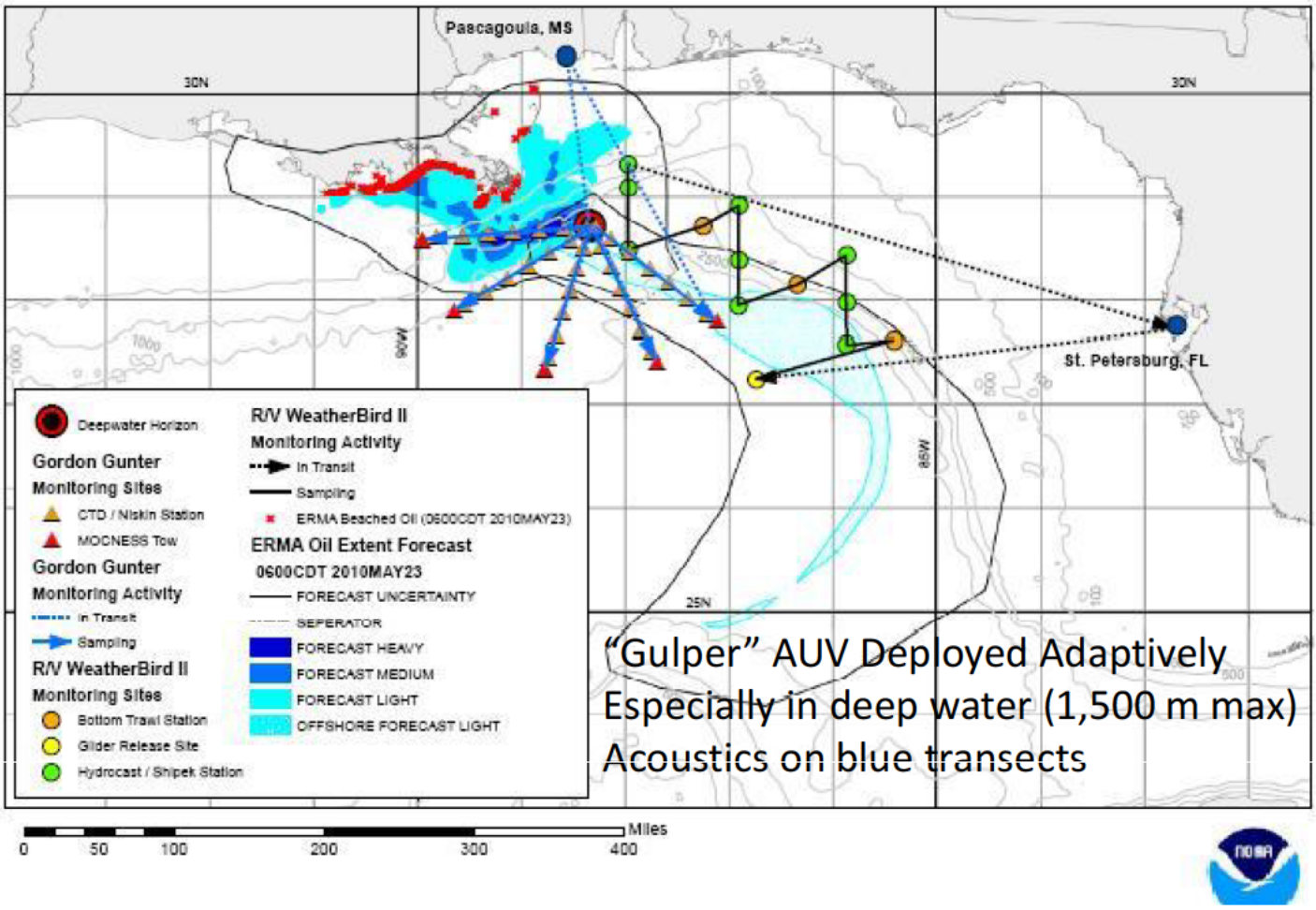
MOCNESS – Multiple Opening and Closing Net Environmental Sampling System

Computer controlled, sampling at discrete depths, able to sample distinct Layers, challenge to clean nets once oiled

Bottom trawling to evaluate impacts on benthos – Weatherbird II

NOAA | National Marine Fisheries Service | Southeast Fisheries Science Center

Deepwater Horizon Subsurface Plume Monitoring and Mapping Cruise

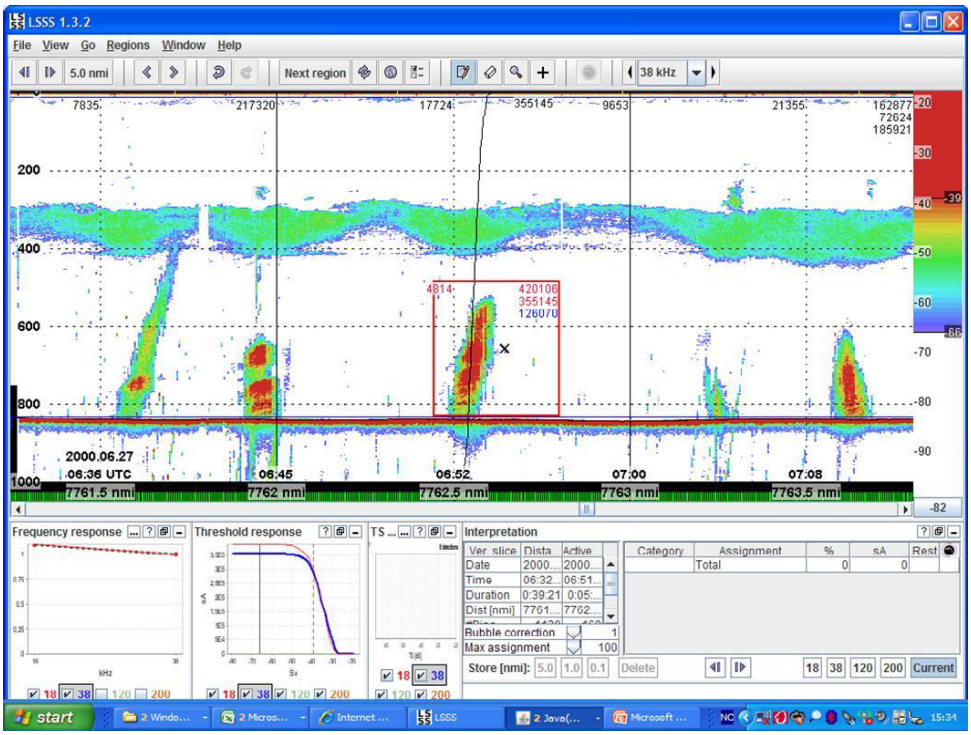


Proposed Cruise Activities – Related to DWH Response and Restoration

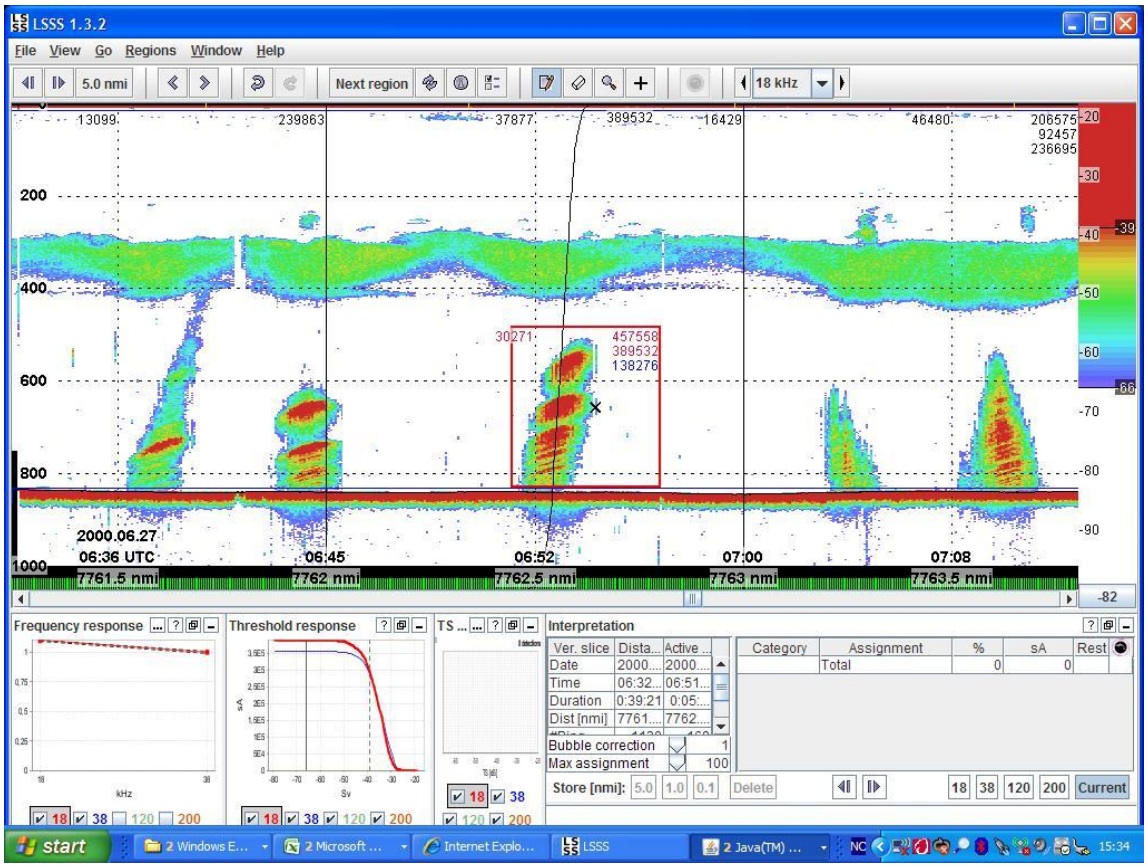
- A primary response-related question relates to the existence and flow characteristics of sub-surface oil and dispersants and how such plumes may move related to the surface oil
- Knowledge of the extent and density of subsurface plumes is vital to NOAA's response activities including development of fishery closures, rescue of marine wildlife, and protection of human health
- The research plan being proposed had three main elements (1) use of the NOAA FSV GORDON GUNTER to use its EK-60 sonar to map the three dimensional echo returns of subsurface layers in a pattern that radiates from known areas where sub-surface oil is likely to assess the potential edges of features (see attached graphic showing echograms of a hydrocarbon release imaged with the proposed unit). Validation of oil and gas and dispersants will be through the use of on-board gas chromatography for a rapid evaluation in order to help adapt the sampling plan, followed by voucher Niskin water samples at depth to be processed in approved laboratories. SEFSC's Mocness (multiple opening and closing nets) will be used to sample impacted biological communities discretely (2) Deployment of the contracted R/V WEATHERBIRD II (U South Florida) to do water sampling at depth and deployment of its glider will provide a south to north set of samples, and rapid detection of oil products as part of this sampling should indicate if sub-surface materials have entered the Loop Current in dispersed but detectable quantities, (3) the deployment of the MBARI "Gulper" AUV and USF gliders is proposed to act as a loitering capability (gliders) and for the AUV to provide deep (to 1,500 meter) sampling at discrete depths, investigation and calibration of echo sounder data and fluorometry
- These integrated activities are supported by work teams looking at the integration of technologies including sampling of affected and non-affected biological communities (e.g., through multiple opening and closing nets - MOCNESS) which will provide discrete biological community structure inside and outside affected areas which is critical for damage assessment capabilities
- Total projected costs for these activities for a seven (7) day cruise are (a) GUNTER NOAA costs =$22,700 per day-OMAO, SEFSC, $57,000 (total, supplies, labor), Larry Mayer's acoustic group $25,000, (b) MBARI glider - $9,200 per day, $6,000 for insurance, and $5,000 for shipping, (c) USF WEATHERBIRD and related sampling = $6,500 per day for vessel, USF supplies = $8,200. **Total: $370,000. For a 16 day Cruise, the costs would be $846,000. propose 7 days with the option of going to a second leg to 16 Days**

38 khz echogram over time of experimental plume release conducted by NORWAY in 2000 at >800 meters. The plume is clearly visible rising off the bottom. Images at 18 khz have higher resolution. Both frequencies are available on the GORDON GUNTER

38 kHz, Simrad EK500



18 kHz, Simrad EK500



GulfofMexicoSPU

bp

MC-252 Incident
SIMOPS Plan

1	4/29/2010	Final – Issued for Use	Geir Karlsen	Houston Incident Commander
0	4/28/2010	Final – Issued for Comments	Geir Karlsen	Houston Incident Commander
Rev	**Date**	**Document Status**	**Custodian/Owner**	**Authority**

Document	Organization ID	Sector ID	Discipline ID	Document Class	Sequence Number	Document Revision
Control Number	2200	T2	DO	PN	4001	1

AMENDMENT RECORD

Revision Number	Amender Initials	Date	Amendment
A	G. Karlsen	April 24, 2010	Initial draft.
B	K. Mouton	April 25,2010	Edits
C	G. Karlsen	April 27, 2010	Comments incorporated.
0	G. Karlsen	April 28, 2010	Comments incorporated, issued for use. Clarified and added comment to Section 1.3: Clarified section and added comment "Source Control SIMOPS Director covers an area of appr. 1,000-m from site". Added Sections 6.9 on Aviation and Section 6.10 on Helicopter Refueling. Added section 1.8 (HazID of operating in contaminated waters and added HazID documents. Updated contact details and general cleanup of doc. Added doc. number from Doc. Control.
1	G. Karlsen	April 29, 2010	Removed 1000-m radius circle from map Fig. 9 and updated with debris field.

REVIEWER SIGN-OFF			
	Name	**Signature (PLEASE PRINT)**	**Date**
Custodian/Owner	Geir Karlsen	GEIR KARLSEN	4-29-10
Reviewer (s)	BP Marine Assurance Rep	Daniel Polk	04-29-2010
	BP Geohazards Rep (AUV,HR2D)	ANDREW W HILL	4-29-10
	BP (IMT) Spill Operations	DIRK SMIT	4/29/10
	BP Wells Rep	CHARLES HOAT	4/29/10
	BP (IMT) Safety Officer	Keith Mouton	4-29-10
	BP (IMT) Source Control Operations	A.S. Emmer	4/29/10
	~~IC Houston~~		
	~~IC On scene Houma~~		
	USCG Houston	NAMIJ SHEPARD	4-29-10
	USCG ~~On scene~~ Houma OPS		
	SIMOPS DIRECTOR	TROY EGOICOTT	4-29-10
Authorizer (s)	BP Discoverer Enterprise Lead	Dan Stalk	4-29-10
	BP DD III Lead	(George Gray)	29-Apr-10
	BP GoM Marine Authority		29-APR-10
	Transocean Incident Commander		29 APR-10
	BP Incident Commander	GARY IMM	29-APR-10
USCG	~~BP~~ On-Scene Commander		27 APR-10
	BP ON-SCENE COMMANDER	Mike Utsler	29-APR-2010

Note: No need for USCG Houma Ops. to sign off as per conversation USCG Commander Mark Shepard and Geir Karlsen on April 29, 2010.

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1 Introduction

1.1 SIMOPS Plan Objectives

The goal of the MC-252 Incident Simultaneous Operations (SIMOPS) Plan is safe and efficient execution of the SIMOPS between all marine and aviation assets deployed in support of the spill and source control operations. The majority of the assets are provided or sourced by:

- Transocean Offshore Inc.
 - Development Driller III (DD III) semisubmersible
 - Discoverer Enterprise (DEN) drillship
- BP Logistics and Aviation (PHI, Chouest, Tidewater, VIH Cougar, Graham Gulf)
- Marine Spill Response Corp (MSRC)
- National Response Corp (NRC)
- Aker Marine
- Subsea 7
- Airborne Services Inc (ASI)
- USCG

The plan seeks to:

Inform members of the unified command involved in SIMOPS for the MC-252 Incident of the principles required for conducting simultaneous operations.

Identify the SIMOPS hierarchy for the major scopes of work between Spill Recovery, Well Control operations and drilling of relief wells.

Outline high-level procedural steps complimented by the detailed processes, procedures and plans (3P) issued by the respective groups. The 3P's are issued and reviewed in conjunction with Hazard Identification (HazID) assessments or planning meetings just prior to the SIMOPS event.

Concurrent operations onboard the assets described above are NOT covered or included in the SIMOPS Plan unless these activities affect other MC-252 Incident operations.

1.2 What Does Success Look Like?

Success is defined as zero SIMOPS clashes, zero SIMOPS impact to schedules and zero SIMOPS incidents. Getting to zero is only possible by strict discipline in the part of all stakeholders to adhere to the elements of the plan.

Remember: "Good SIMOPS is all in the communications."

1.3 The SIMOPS Team

SIMOPS Director - Overall responsibility for coordinating the execution of SIMOPS events. The SIMOPS Director resides in Houston.

Offshore Spill Operations SIMOPS Branch Director - Overall responsibility for coordinating the execution of Spill SIMOPS events. Position resides onboard Louisiana Responder.

Offshore Source Vessel Control SIMOPS Branch Director - Overall responsibility for coordinating the execution of Source Vessel Control SIMOPS events. Position resides offshore onboard the DD III or the Discoverer Enterprise. The Branch Director generally controls the areas inside the rigs 500-m zone and an area of appr. 1,000-m from the Macondo site. See **Figure 8**, page 35.

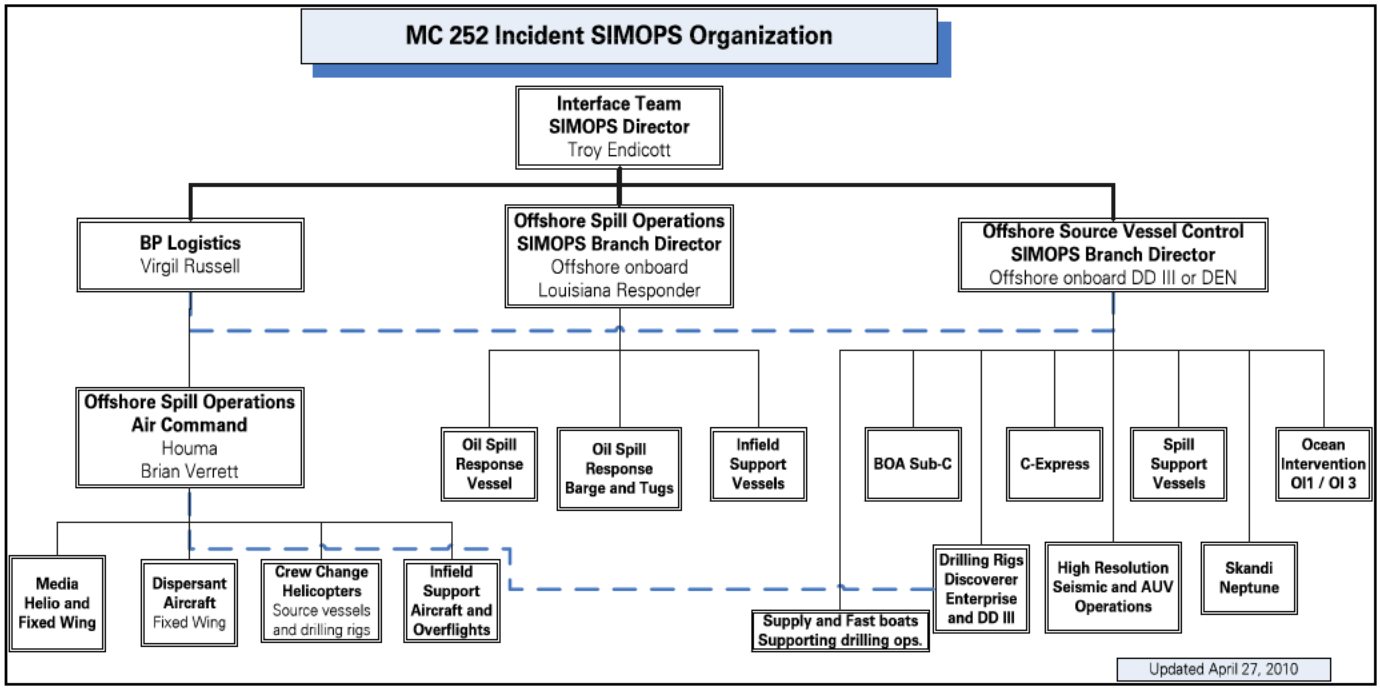
BP Logistics - Overall responsibility for providing air support to the project. Group resides in Houston.

Offshore Spill Operations Air command - Overall responsibility for coordinating and scheduling all aircrafts including fixed wing, crew change helicopters, dispersant deployments, over flights, recons and spotter planes. Position resides in Houma.

Vessel Person in Charge (VPIC) – Is the BP Vessel Rep. onboard. Can also be the OIM or the Well Site Leader. The VPIC is responsible for all Health, Safety, Security and Spill (HSSE) incidents. All incidents will be reported using the Notification scheme contained within the plan.

Note: Any person involved in a SIMOPS event has the authority and obligation to discontinue and shut down the SIMOPS event in the case of safety or operational concerns.

Figure 1: SIMOPS Communications Plan



SIMOPS events will be coordinated through daily SIMOPS call as per Section 2.5, page 14.

1.3.1 Onshore SIMOPS Director Responsibility

- Chair the daily SIMOPS call (see Section 2.5, page 14).
- Be the overall coordinator of SIMOPS activities at MC-252 Incident.
- Ensure SIMOPS events comply with HSSE guidelines.
- Identify need of SIMOPS HazIDs and SIMOPS reviews prior to a SIMOPS event.
- Assess potential schedule impact and associated risks from upcoming SIMOPS events.
- Liaison with leadership team on SIMOPS issues, scheduling and technical conflicts.
- Identify critical path and determine which operation has priority.
- Assess risks of single and multiple operations and SIMOPS events.
- Facilitate resolutions of any SIMOPS conflicts with the teams.
- Coordinate SIMOPS issues between the Discoverer Enterprise, DD III, Marine Activities and Aviation.

1.3.2 Offshore Spill Operations SIMOPS Branch Director Responsibility

- Be the overall coordinator of the execution of SIMOPS activities in the spill clean up operation.
- Direct vessels as per the daily operating plan.
- Identify resource needs.
- Liaison with the vessels in the cleanup fleet.
- Ensure spill cleanup SIMOPS events comply with HSSE guidelines.
- Assess potential schedule impact and associated risks and convey to the SIMOPS Director.
- Work with vessel Captain on all SIMOPS and HSSE.

1.3.3 Offshore Vessel Source Control SIMOPS Branch Director Responsibility

- Be the overall coordinator of the execution of SIMOPS activities in the fleet of source vessels.
- Area of responsibility is in the Macondo well area and the debris field out to appr. 1,000-m from site.
- Direct vessels as per the daily operating plan.
- Identify resource needs.
- Liaison with the source vessels.
- Ensure vessel activities comply with HSSE guidelines.
- Assess potential schedule impact and associated risks and convey to the SIMOPS Director.

1.3.4 Vessel Representative (VPIC)

Source control vessels and possibly some of the spill cleanup vessels will have a vessel rep. onboard. The vessel rep. responsibility is to:

- Implement specific programs concerning ROV, salvage, search and clean-up.
- Ensure HSSE and safety guidelines are followed onboard the vessel and in vessel ops.
- Provide guidance for the specific operation.
- Comply with operating procedures and applicable MC-252 Incident SIMOPS requirements.
- Work with vessel OIM or Captain on SIMOPS issues.
- Call-in on the daily SIMOPS call.

1.3.5 SIMOPS Interface Team (Member)

Assigned for each area of operations, such as well operations, ROV operations, spill clean-up, AUV and 2D Seismic surveying, Salvage and Recovery operations. The position resides onshore. Responsibilities are:

- Implement specific installation and construction programs.
- Arrange SIMOPS review meetings and HazIDs.
- Comply with operating procedures and applicable MC-252 Incident SIMOPS requirements.
- Establish communication plan between their SIMOPS supervisory personnel.
- Assist the MC-252 Incident SIMOPS Director in implementing the MC-252 Incident SIMOPS Plan.
- Provide progress report to the MC-252 SIMOPS Director.

1.4 Management of Change (MoC)

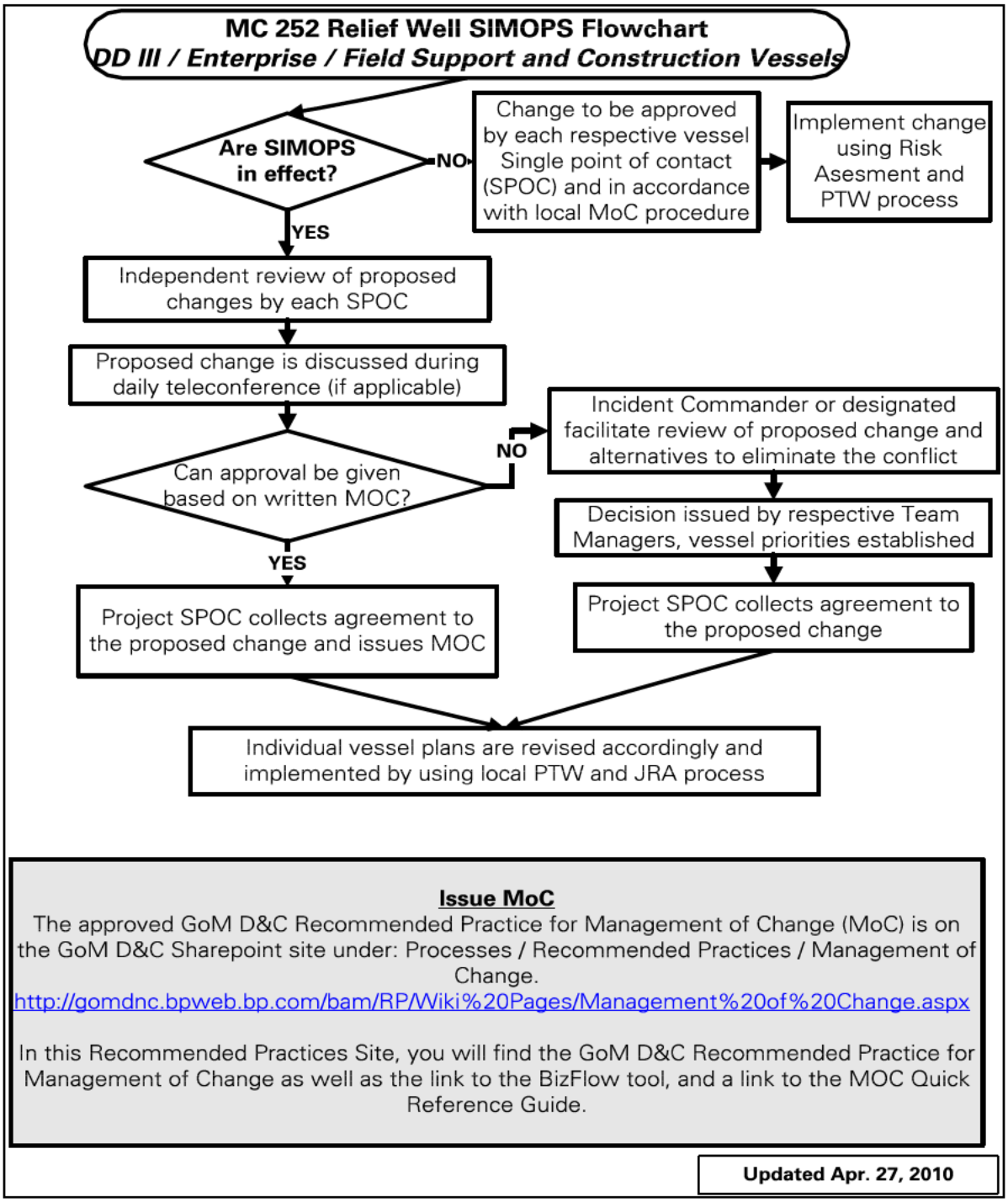
The MoC process is used in conjunction with changes to procedures and the SIMOPS schedule. Temporary and permanent changes are managed to ensure that health, safety, and spill risks remain at acceptable levels. The plan intends to exceed BP's Operations Management system (OMS), expectations, regulatory requirements and local needs.

Figure 2, page 11 shows the SIMOPS MoC procedure for changes in the MC-252 Incident program.

The GoM MoC process uses BizFlow found at the BP Intranet site:

http://gomdnc.bpweb.bp.com/bam/RP/Wiki%20Pages/Management%20of%20Change.aspx

Figure 2: MC-252 Incident SIMOPS MOC Process



1.5 HazID Assessing Operations in a Contaminated Environment

A HazID was held April 28, 2010 to assess the risks of the Discoverer Enterprise and the DD III being exposed to hydrocarbons either from a sheen or from a plume of oil. The HazID followed Trans Ocean's internal HazID the previous day.

There were no show stoppers identified during either HazID. The Operation Teams of the Discoverer Enterprise and the DD III were tasked with the assembly of an emergency disconnect plan should the direction of the plume change towards the rigs or should there be a catastrophic change to the volume of released hydrocarbons.

The HazID action items are found in Table 1 below.

Table 1: HazID Action Items

	Activity	Action	Responsible Person	Due Date
1	**Rig Operations**	Develop a decision matrix for various scenarios of increased oil flow that could impact the drill rig.	George Gray	
2		Include in IAP that source control immediately communicates any flow changes to the SIMOPS Director	Troy Endicott	Prior to ops.
3		Develop a model to predict plume location based on subsea currents. Consider the impact of rapidly increasing flow rate.	Troy Endicott	
4		Determine the location and density of oil/water emulsion / mousse floating below the surface.	Troy Endicott	
5		Convey IMT air monitoring and safety plan to the vessels.	Joe Neumeyer	Prior to ops.
6	**Other Operations**	Send 500 meter zone to branch directors.	Troy Endicott	Prior to ops.
7		Communicate to the IMT the drill rigs request to maintain a minimum of one mile distance for dispersant application or in situ burning.	Troy Endicott	Prior to ops.

The risk ranking and HazID results are found in Figure 11, page 41, Figure 12, page 43 and Figure 13, page 45.

2 Field Communications and Emergencies

2.1 Crisis Management

The Gulf of Mexico Deepwater Development (GoM DWD) Emergency Response Plan Guidelines are initiated should any emergency occur during a SIMOPS event. The SIMOPS event will be terminated or postponed until the emergency is cleared.

Any emergency onboard the Discoverer Enterprise, the DD III or associated vessels will be reported immediately to the other vessels and the Offshore SIMOPS Branch Director to ensure necessary precautions can be taken.

2.2 Severe Weather Contingency Plan

See GoM IMS Vol. III – Severe Weather Contingency Plan (see References in Section 7, page 48).

The Crisis Center at WL-4 handles the management of severe weather planning and field evacuation guidance.

2.3 Emergency Evacuation Plan

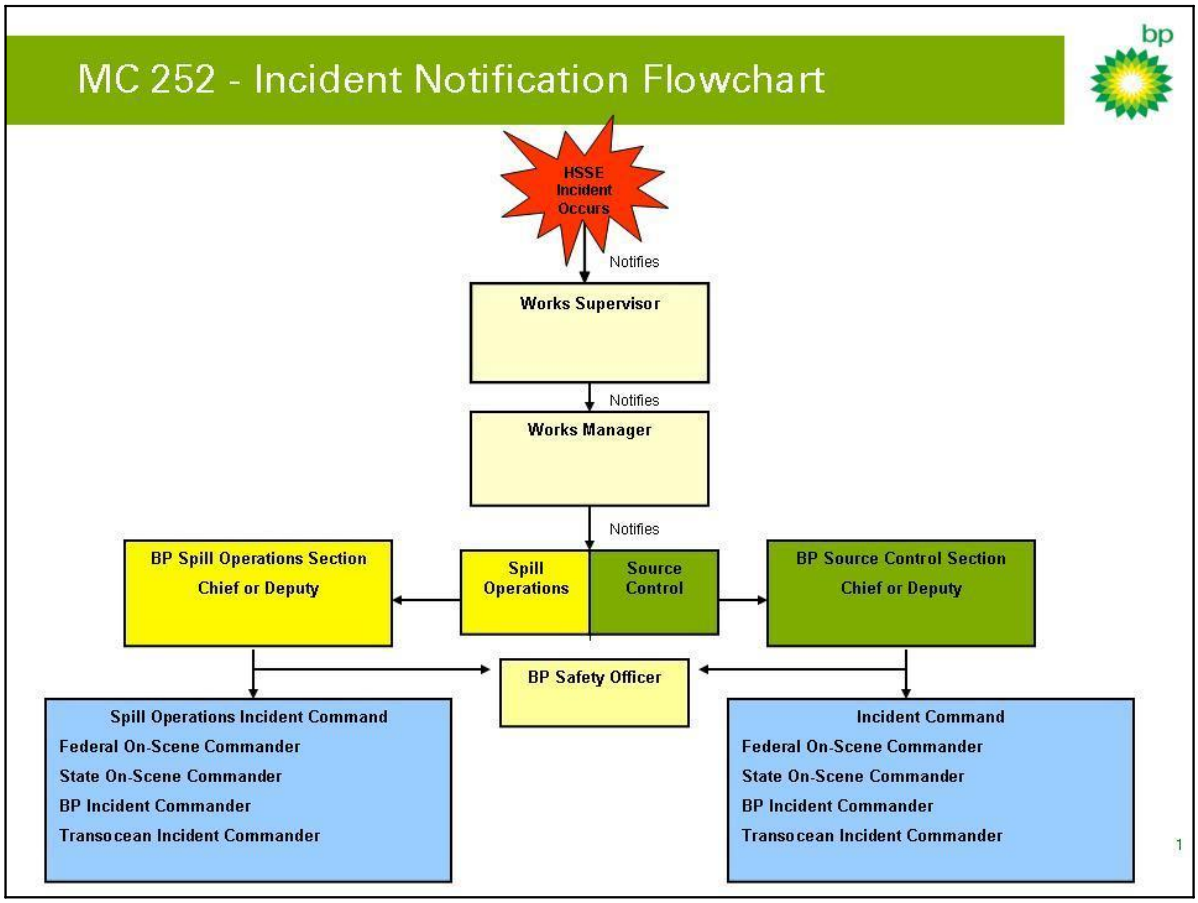
See GoM DWD Emergency Evacuation Plan (see References in Section 7, page 48).

2.4 Incident Notification

The Incident Notification Chart shown in Figure 3, page 14 is the main routing of incident notifications on the project.

It is recognized, however, that the MC-252 Incident operation is complex and that there is a possibility of incidents being reported through different channels.

Figure 3: Incident Notification Chart



2.5 Daily SIMOPS Conference Call

The SIMOPS Director chairs the daily SIMOPS conference call.

The following calls in to the SIMOPS call:

1. Each MC-252 Incident ROV and construction vessel
2. The lead spill clean-up vessel.
3. Houma IC.
4. Houston IC.
5. Discoverer Enterprise and DD III OIM and Well Site Leader (WSL) or designees.
6. BP vessel rep. and PIC on vessel(s) performing SIMOPS in the MC-252 Incident field.
7. Impact Weather and Horizon Marine (only if met-ocean conditions dictate).
8. Shore-based personnel as required

Work boats and fast boats are not required to participate.

The purpose of the daily SIMOPS conference call is to:

- Provide daily SIMOPS support to all MC-252 Incident groups.
- Get the latest met-ocean updates (Impact Weather and Horizon Marine to participate on an as-needed-basis).
- Ensure all activity centers are fully aware of ongoing and upcoming field activities and SIMOPS events.
- Review SIMOPS schedule issues.
- Ensure activities from outside operators (such as pipe-lay and seismic operations) are flagged.
- Review VHF and acoustics communication needs and clashing issues.
- Ensure the SIMOPS events are planned and executed according to the program with no impact to HSSE and minimum impact to other operations.

Table 2 below shows the details of the conference call center.

Participants call the Toll-free or the Toll numbers and then the Pass-code to get into the conference call.

Table 2: Conference Call Center

Dial-In Numbers and Pass Codes	Toll-Free number from inside USA:	[redacted]
	Participant pass code:	[redacted]

Each operation issues a daily SIMOPS report to the SIMOPS Director that is reviewed prior to the SIMOPS call. The report is a short synopsis of last 24-hours and the coming 24-hours utilizing Incident Action Plan (IAP).

The SIMOPS call agenda is:

- Met-ocean update (wind, waves and currents).
- Sheen, plume and marine debris update.
- Vessel Summary
 - Discoverer Enterprise – Current operations, SIMOPS events, next activity, special issues, Q&A.
 - DD III – Current operations, SIMOPS events, next activity, special issues, Q&A.
 - ROV vessels – Current operations, special issues, Q&A.
 - Construction and intervention vessels – Current operations, SIMOPS events, next activity, special issues, Q&A.
 - Barge and tugs – Update on current operations and next 24-hrs.
 - Spill clean-up vessels – Area of operation, sheen and plume update.
- SIMOPS issues, communications and VHF use, scheduling, conflicts and concerns.

2.6 SIMOPS Communication Guideline

Well-planned and established communications are keys to the successful execution of the MC-252 Incident SIMOPS. The SIMOPS Branch Directors must communicate with the respective Vessel Reps. / OIMs / Captains prior to the start of any SIMOPS activity and during the SIMOPS event as conditions require.

Remember: "Good SIMOPS is all in the communications."

2.7 Field Communications

2.7.1 Hailing Channels VHF 15 and VHF 16

Vessels approaching the field will use Channels 15 or channel 16 to call up the Discoverer Enterprise or the DD III Bridge. Channel selection, following the initial hailing is agreed upon with the respective installation.

Channel 15 and channel 16 are always monitored by the Discoverer Enterprise and the DD III. See Table 3, page 16.

Once the appropriate MC-252 Incident facility (Discoverer Enterprise or DD III) is hailed, the channel is switched to an agreed frequency as per Table 3. The table is a guideline and lists the agreed MC-252 Incident VHF channels. It is anticipated that radio noise and high usage may require selection of other channels at times.

The fleet of Source Control and Oil Spill Response vessels will work through the Onshore SIMOPS Director to establish field radio procedures and agree on channel selections.

Radio use and frequency selection will be part of the daily SIMOPS call.

Table 3 below shows the VHF hailing and the working channels for the MC-252 Incident field.

Table 3: VHF and UHF Working Channels

Location	Discoverer Enterprise	Discoverer Enterprise ROV	DD III	DD III ROV
Hailing general	16		16	NA
Bridge to Bridge	15		13	
Bridge to boat	10, 11, 12		13	
Port crane	10, 11, 12		67	
Starboard crane	10, 11, 12		68	
Crane to boat	10, 11, 12		Port: 67, Stb. 68	
Bulk and liq. Transfer	8, 15		72, 88	
ROV	No radio	8		72, 88
Discoverer Enterprise Bridge to maintenance	64	NA	NA	NA
Spare channels	6, 69, 71, 73		6, 69, 71, 73	
UHF	2, 5, 9		3, 6, 9, 13	3, 6, 9, 13
Helicopter	123.05		122.700	
Notes:	Source control vessels and environmental cleanup vessels are hailed on ch. 15 and ch. 16			
				Updated April 27, 2010

2.7.2 Radio

Vessels and aircraft, under contract to BP, are equipped with BP radios in addition to the contractor's communication equipment.

Operators of vessels involved in SIMOPS activities must agree upon *primary* and *secondary* radio communication frequencies prior to the start of any SIMOPS activity.

Note: Conduct radio check and confirm operability prior to start of any SIMOPS event.

2.7.3 Emergency Communications

For emergency response communication procedures and contact information, reference the "GoM DWD Emergency Response Plan" (see Section 7, page 48).

3 Acoustic Frequency Management and Position Referencing

The Acoustic Frequency Management Plan is summarized in Table 6, page 22 and in Figure 10, page 39.

Please note the following:

1. Horizon DP array transponders have been recovered and are not featured in the plan.
2. It is essential that all vessels with dual head HiPAP systems configure the system to track all transponders from a single head (all transponders tracked from the same head).

3.1 Enabling and Disabling of Transponders and Responders

The Dynamic Positioning Operator (DPO) onboard the Discoverer Enterprise and the DD III are responsible for the management and safe use of the acoustic frequencies at MC-252 Incident.

No acoustics will be turned on or off without the concurrence of the DPO onboard the Discoverer Enterprise and the DD III.

Warning:	**The Discoverer Enterprise and the DD III DPO will manage the acoustics in the MC-252 Incident field. There will be no enabling or disabling of acoustic channels without the DPO's concurrence.** **Do not change allocated channels without the concurrence of the Discoverer Enterprise and the DD III DPO. The main requirement of the Acoustic Management Plan is to prevent frequency clashing and risk interference or loss of acoustic position referencing for the Discoverer Enterprise and the DD III.**

Note that any noise issues degrading the acoustic position reference system *MUST* be reported to the OIM and the Well Site Leader. Under no circumstances should the acoustic system be disabled because of degraded signal to noise ratio. Disabling the acoustic system would bring the rig from a DP Class II to a DP Class I DP operation. **Note: TOI approval contingent on: "**acoustic system may be taken out of solution if degraded".

3.2 Safe Distance

The Frequency Management Plan assumes there is no safe distance where acoustics will not interfere, especially with the short distance between vessels. The plan produced a set of compatible channel allocations and guidelines that will allow each vessel to operate freely without concern as to the effect on other vessels nearby.

3.3 Echo Sounder Turnoff

Any vessels entering the MC-252 Incident area must turn off the echo sounders within 5-nm of arriving in the MC-252 Incident field. This is to ensure echo sounders do not create noise in the water column and

interfere acoustically with any of the vessels using acoustic communications. Do not turn on echo sounders until the vessel is outside this 5-nm limit.

Caution:	**Compliance with the echo sounder turnoff while in the MC-252 Incident field is mandatory.**

It is the responsibility of each MC-252 Incident group contracting vessels, the Logistics Group and the Fourchon Base to notify and inform the MC-252 Incident vessels of the Echo Sounder turnoff requirements.

3.4 Acoustic Frequency Coordination

3.4.1 Coordination of Acoustic Activities

All information, regarding the coordination of the MC-252 Incident Acoustic Frequency Management Plan, is directed to the respective rig's Team Leader.

Jonathan Davis with BP, Dave Ross with UTEC Survey, together with Kongsberg and Sonardyne, will assist in troubleshooting frequency clashes and interferences (see phone list for contact details).

3.5 Acoustic Equipment Use Notifications

Source vessels will work in close proximity to the Discoverer Enterprise and the DD III. These vessels must follow the Frequency Management Plan and the acoustic guidelines before enabling acoustic equipment.

3.5.1 Acoustic Field Operations

For acoustic operations at MC-252 Incident, vessels will inform the DEN and the DD III Bridge of arrival in the field. The following must take place prior to commencement of acoustic operations:

- Confirm field arrival and departure.
- Confirm all frequencies in use by the Discoverer Enterprise and the DD III as per Table 6, page 22.
- Confirm pre-approved acoustic channel allocations for the upcoming operation.
- Advise the Discoverer Enterprise and DD III of minimum proximity requirements between vessels.
- Advise the Discoverer Enterprise and DD III DPO when channels are enabled and disabled.
- Advise the Discoverer Enterprise and DD III DPO of source vessel channel selections.
- Be prepared to immediately disable acoustic channels in case of degradation of the Discoverer Enterprise and the DD III acoustic position reference systems.
- Discoverer Enterprise and DD III to advise vessel of any acoustic position reference system response and degradation from the added acoustics in the water column.

Caution:	**No vessel shall deploy transponders without first contacting the DEN and the DD III DPO and receiving confirmation as to channels in use. The DEN and the DD III and any vessels using acoustics will be in continuous communications concerning acoustic noise and frequency clashing.**

3.6 Fan Beam

Fan Beam is a position reference system used while vessels are in proximity. Workboats and supply boats, as well as vessels carrying out subsea construction, utilize Fan Beam. The system's maximum range is 2,000-m with an accuracy of ±10 cm during optimum conditions. The system uses a laser beam and is, therefore, weather sensitive. The practical range for Fan Beam is in the range of 200-m to 400-m.

The key to a successful operation of the Fan Beam position reference system is to ensure the system is maintained, fully operational and in Green status and that the Fan Beam is set up according to the manufacturer's specifications.

Particular attention is required to the system setup. The gating parameters must be set correctly to ensure the intended target is followed. This may have been a problem in the past. There are known instances where the laser beam has locked onto a moving object onboard the adjacent vessel. The moving object may have been someone in coveralls with reflective tape.

Note: Any vessel working the MC-252 Incident area and using Fan Beam as a relative position reference system, must confirm that the system is operational according to manufacturer's specifications before the system is allowed to be used near the DEN, the DD III.

The Fan Beam User Guide v. 4.1 is listed as a reference in this document. *The user, however, shall always check with the manufacturer to ensure the correct and latest version of the user guide is utilized for setting up the Fan Beam systems on the particular vessel.*

The MC-252 Incident vessels have their Fan Beam laser units installed at different heights. Adjustments may be required in the height of the prisms installed on the Discoverer Enterprise and the DD III to conform to vessel requirements.

The Discoverer Enterprise and the DD III OIM should determine correct prism height and location based on communications with the respective user of Fan Beam systems. Table 4, page 20 lists the Fan Beam height for some vessels which may be used at MC-252 Incident.

Table 4: Fan Beam Height

MC-252 Incident Vessels	Fan Beam Height Above Sea Level	Ideal Reflector Height above Sea Level
		The reflector height is determined by the application and distance between vessels and is generally set at Fan Beam height -0 +17-ft.
Schlumberger DeepSTIM II	44-ft.	
Technip Deep Blue	102-ft.	
OI1	56-ft.	
OI3	74-ft.	
C-Captain	45-ft.	

There is a wide variation in Fan Beam installation heights between vessels. The Fan Beam prisms, installed on the DEN and the DD III, will require elevation and position changes, depending on which vessel is utilizing the system. Adjusting the height will improve the system performance and reduce Fan Beam positioning errors.

Table 5 below lists the MC-252 Incident vessels using Position Reference systems.

Table 5: Vessels using Position Reference Systems

MC-252 Incident Vessels	Available Position Reference System	Notes
Discoverer Enterprise	DGPS, Acoustics (Sonardyne digital)	DP Class II+
DD III	DGPS, Acoustics (HiPAP)	DP Class II+
Source control vessels	DGPS, Fan Beam and RADius. Acoustics for tracking and surveying	DP Class I and II Some vessels may not have been assessed for DP class
Spill clean-up vessels		Not assessed for DP class

3.7 RADius Position Reference System

The RADius position reference system measures relative distance between two adjacent vessels using the Doppler principle. The adjacent vessel is equipped with RADius transponder(s). The system has a range of approximately 1,100-m and is not affected by activities onboard the adjacent vessel. A transponder system consisting of a small box is installed onboard the host vessel (i.e., Discoverer Enterprise and DD III). The system requires a 120-volt power source. Range accuracy is 0.25-m.

Note: Any vessel, working the MC-252 Incident area and using RADius as a relative position reference system, must confirm that the system is operational according to manufacturer's specifications before the system is allowed used near the Discoverer Enterprise and the DD III.

Table 6: MC-252 Acoustic Allocation Summary

DD III DP	**DP** b31 DP b32 DP b35 DP b37 DP b73 DP b76 DP LIC	**DD III**	**ROV System** b14 Tracking b28 Tracking b34 Tracking b48 Tracking b54 Tracking b68 Tracking b74 Tracking	**DO NOT USE** b12 b13 b15 b17 b51 b52 b53 b57 b71 b72 b75
Discoverer Enterprise DP array: Sonardyne wideband Family 14, CIS. Ch. 1409, 1410, 1411, 1412, 1413				
BOA SUB C	b18 SPARE b24 CRANE 1 b26 DP 1 b38 MILL 36 b46 SPARE b58 MILL 36 SPARE b64 CRANE 2 b78 MILL 37 b84 MILL 37 SPARE b86 DP 2	**MISS GINGER**	b27 Emergency AUV b42 AUV b47 SPARE b62 SEABIRD b67 SPARE b82 SPARE b87 SPARE	The acoustic allocations for all construction vessels are found in Figure 10, page 34, Figure 11, page 35 and Figure 12, page 35. **It is imperative that the plan is adhered to and that there are no changes without preapproval.** The DD III ROV channels may be utilized bby others if not required by the DD III operation.
OI 3	b16 Tracking b23 Tracking b36 Tracking b43 Tracking b56 Tracking b63 Tracking b83 Tracking	**SKANDI NEPTUNE**	b21 Tracking b25 Tracking b41 Tracking b45 Tracking b61 Tracking b65 Tracking b81 Tracking b85 Tracking	
OI-3	**Wideband Family 12 (see below)** Address 1201, CIS 1 ROV 1 Address 1202, CIS 2 ROV 1 Cage Address 1203, CIS 3 ROV 2 Address 1204, CIS 7 ROV 2 Cage			
C-Express	**Wideband Family 15 (see below)** Address 1512, CIS 4 ROV Address 1513, CIS 5 ROV Backup Address 1514, CIS 6 ROV TMS		CIC = Common Interrogation Signal	

4 SIMOPS Events

4.1 SIMOPS Events

The SIMOPS plan contains multiple events and interfaces between the Discoverer Enterprise at relief well location RxC and DD III at relief well location RxD.

Anticipated SIMOPS events are:

- Discoverer Enterprise operating at relief well location RxC and DD III at relief well location RxD.
- Source control vessel activity inside the Discoverer Enterprise and the DD III 500-m exclusion zones.
- Source control vessel activity alongside the Discoverer Enterprise and the DD III.
- Spill clean-up vessel activity inside the Discoverer Enterprise and the DD III 500-m exclusion zones.
- Pumping vessel alongside Discoverer Enterprise or DD III.
- Salvage operations.
- Barge and tug boats.
- Aviation.
- In-situ burns (requires separate risk assessment and approval).

Note: There is no requirement to develop a separate SIMOPS procedure for any of the MC-252 SIMOPS events. Detailed project operating procedures specifically developed in conjunction with and referring to the MC-252 SIMOPS plan are required.

Table 7: SIMOPS Preplanning General Checklist

Activity	Well Site Leader	OIM	DPO
Vessel within 500-m of Discoverer Enterprise and DD III.	To be informed and approve arrival.	Approve.	Prepare DEN and DD III most favorable heading. Ensure communications to vessel are as planned.
In close proximity to, alongside or equipment hooked up to DEN/DD III.	To be informed.	Approve through Permit to Work (PTW) process.	Ensure communications to vessel are as planned.
Station-keeping alongside.	To be informed of met-ocean conditions and any heading change of DEN/DD III and vessel in SIMOPS.	To be informed of met-ocean conditions and any heading change of DEN/DD III and vessel in SIMOPS.	Communicate with vessel in SIMOPS on all DP matters.
Fan Beam prism installation.	To be informed of station-keeping readiness.	To determine correct height based on vessel alongside.	Ensure fully operational.
Degradation in station-keeping ability of vessel(s).	To decide on further action together with OIM.	~~Vessel Captain together with DEN/DD III~~ DPO to assess and decide on action according to WSOC. **Note: TOI strike out. Approval contingent on DPO making decision according to WSOC.**	
SIMOPS with other ops.	To be informed.	To approve.	Requirements as above.

4.2 Emergencies during SIMOPS Events

Emergencies onboard one of the vessels involved in SIMOPS impact the ability to proceed with SIMOPS. The SIMOPS planning should specifically address emergencies during SIMOPS events, mitigations and restrictions associated with such emergencies.

Use the following guidelines to shut down or postpone the SIMOPS event, which may reduce the ability of personnel to respond effectively to an emergency:

- Sheen, plume or surface debris that could impact the SIMOPS event.
- Any condition the OIM, Captain or the BP Well Site Leader determines to exist or develop and which would compromise safety of crews, equipment or vessels during the SIMOPS execution.
- Any event where acoustics communications are interfering with station-keeping of any vessel.
- Any fire requires vessels to suspend activities except those required to handle the event.
- Any hull emergency requires vessels to suspend activities except those that are required to handle the event.
- Any loss of firewater pumps requires vessel to suspend all activities at a secure point.
- Any loss of communication requires vessels to suspend all activities at a secure point.
- Any met-ocean event that could jeopardize station-keeping or operations during the SIMOPS event.
- Any event that takes a vessel out of readiness condition such as power, cooling and fuel systems, power management system, position reference systems and DP system.

4.3 SIMOPS Approval

The complexity of the SIMOPS activity determines the level of approval required for the work plan. Use the following procedure as a guideline:

- The SIMOPS Director has the overall responsibility for determining SIMOPS priorities and give necessary approvals following review with Branch Directors and Air Command.
- The SIMOPS Branch Directors approve SIMOPS events within their fleet after review with the SIMOPS Director and the respective vessels.
- The vessel OIM / Captain approves SIMOPS events associated with the respective vessel.
- The BP Well Site Leader, with input from the respective OIMs and Branch Directors determine the level of authority required to approve a safe work plan for a more complex activity inside the Discoverer Enterprise and the DD III 500-m zones.

5 Dropped Objects Prevention

5.1 Drilling Vessels

Any dropped object is to be reported through regular channels. There are no infrastructure concerns at the respective well sites. There are a number of pipelines and wellheads in the area, so dropped object prevention must have the same focus as when working in any of BP's fields.

5.2 Source Vessels and Marine Clean-up Vessels

Any dropped object must be reported as per the Incident Notification Chart. The Discoverer Enterprise and the DD III Bridges should be notified as well on any dropped object incident.

Caution:	**Vessels inside the MC-252 Incident field MUST promptly report a dropped object incident to the DEN and the DD III Bridge.**

6 Area Vessel Control and Aviation

The key to vessel control is through good communications. The daily SIMOPS call is the main venue to inform of upcoming vessel activities and requirements.

6.1 Surface Conditions

Marine debris and hydrocarbons will to a large extent determine activities at MC-252 Incident. An assessment is being made on DEN and DD III operability while being exposed to a surface sheen or the plume. Daily updates on sheen and plume developments together with marine debris updates are provided to ensure appropriate marine decisions can be made.

6.1.1 Sheen and Plume

It is likely that the DEN and the DD III will be exposed to a sheen or the plume. This depends on met-ocean conditions and the volume of hydrocarbon (HC) being released. The DEN and the DD III bridges will stay in communications with the Spill clean-up vessels and be notified of any changes in weather patterns that may result in HC reaching the well sites.

6.1.2 Marine Debris

Discovery of marine debris will be broadcasted to the fleet by the first observer. Recovery will be handled by the appropriate team as required.

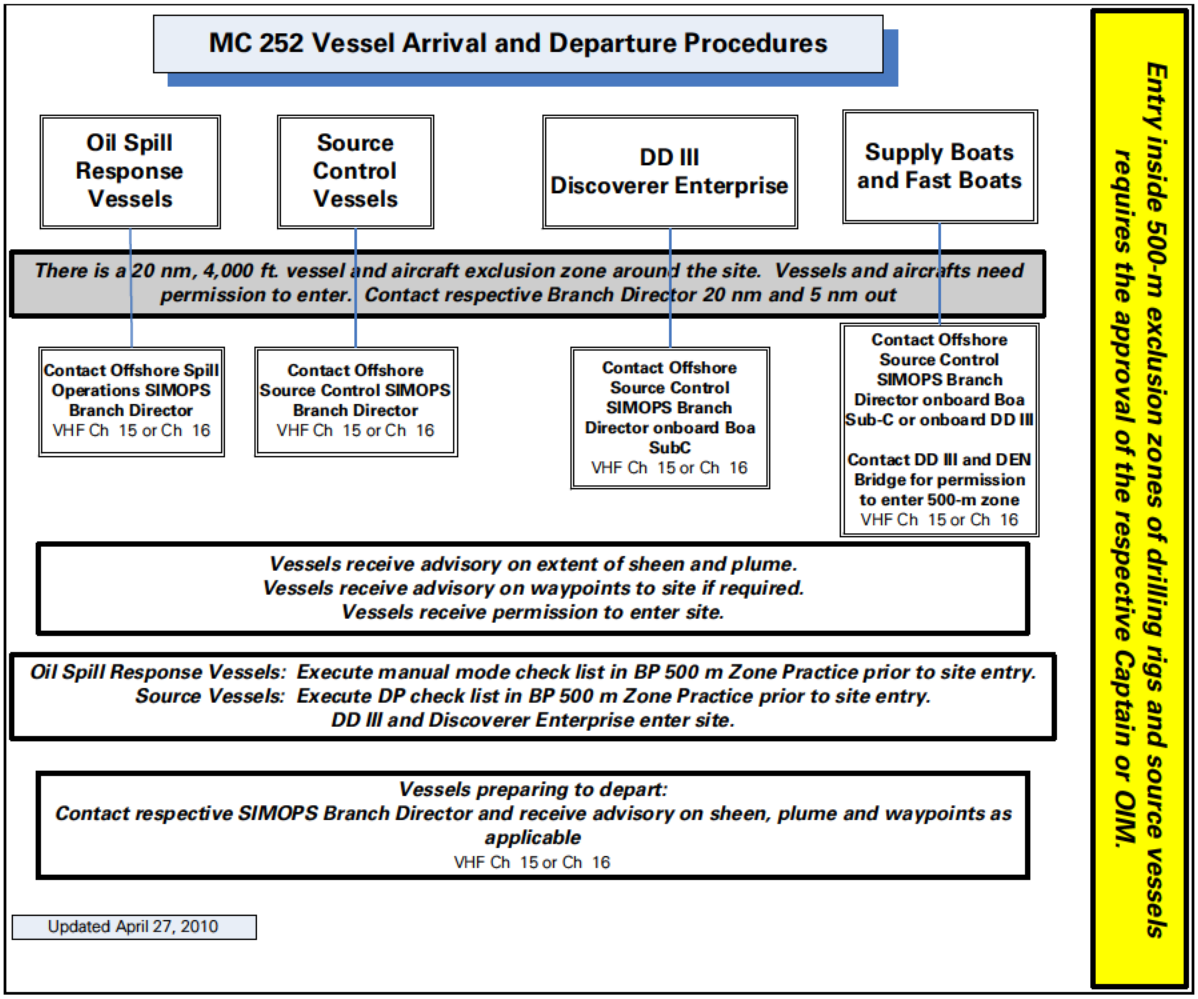
6.2 Vessel Arrival at MC-252 Incident

Surface and marine debris conditions determine how vessels arrive at the MC-252 Incident site. A Marine Debris Exclusion Zone map in Figure 7, page 33.

6.2.1 Arrival and Departure Procedures at MC-252 Incident

Vessel arrival and departure will follow the procedures set up in Figure 4, page 27. The number of vessels on DP and connected to the seabed either trough drilling risers or ROVs requires careful planning of vessel movements.

Figure 4: Vessel Arrival and Departure Procedures



6.3 Drilling Vessels

The DD III and the DEN are arriving from the SW and will move on to location from the standby and staging area once receiving approval through the Team Leader.

6.3.1 Staging Area

The DD III and the Discoverer Enterprise will move to the Staging and Standby area in MC 339 as shown in Figure 5, page 30. Preparations to start operations may be carried out at this location until approval is received for moving to the well location or the standby area to the south of the well location (see next section).

6.3.2 Standby Area

The DD III and the Discoverer Enterprise will move to the Standby area from the Staging area where operations will commence. The Standby areas are located 3,000-ft. to the south of the relief well locations RxC and RxD as seen in Figure 7**,** page 33. Conductor and tubulars may be deployed at this point.

The Standby areas are approximately half distance between the well centers and the ENI pipeline to the south (see **Figure 7**, page 34).

6.4 Source Control Vessels

Source vessels will be directed through the Incident management Command and are not expected to interact with the Discoverer Enterprise and the DD III to any extent.

The Discoverer Enterprise and the DD III 500-m exclusion zones will be adhered to. Entry into any of these zones requires Discoverer Enterprise or DD III OIM approval.

Please note that the Discoverer Enterprise and the DD III 500-m exclusion zones overlap. Any passage between the two rigs will, therefore, require Discoverer Enterprise and DD III OIM approval.

6.5 Oil Spill Response Vessels

Oil spill response vessels will be directed through the Incident Management Command via the SIMOPS Branch Director and are not expected to interact with the Discoverer Enterprise and the DD III unless the plume direction changes to the south.

It is essential that the Discoverer Enterprise and the DD III are notified of any clean-up vessel activity in the vicinity of the well operations and especially inside the rigs 500-m exclusion zones.

Note: The Discoverer Enterprise and the DD III 500-m exclusion zones will be adhered to. Entry into any of these zones requires Discoverer Enterprise or DD III OIM approval. Please note that the DEN and the DD III 500-m exclusion zones overlap. Any passage between the two rigs will, therefore, require Discoverer Enterprise and DD III OIM approval.

6.6 Hailing Channels VHF 15 and VHF 16

All vessels approaching the Discoverer Enterprise and the DD III will use VHF channels 15 and channel 16 to call up the Discoverer Enterprise or the DD III Bridge.

6.7 Working Channels

Once the targeted rig or vessel is hailed, the channel is switched to an agreed frequency as per Section 2.7, page 16.

6.8 GoM 500-Meter Zone Practice

Any vessel entering the 500-m exclusion zone of any MC-252 Incident vessel shall comply with the requirements in the 500-m Zone Practice. The document is issued by the BP Marine Vessel Operations group.

The nature of the MC-252 Incident operation, however, requires flexibility in how vessels interact. It is anticipated that the Captains on the Source Control vessels and the Spill clean-up vessels review proximity requirements between vessels and have an agreement in place concerning procedures and safeties.

Entry into the DEN and the DD III 500-m exclusion zones, however, takes place according to the 500-m Zone Practice.

Caution:	**Critical vessel repairs and maintenance shall be performed either before or after the SIMOPS event. No critical vessel repairs will be performed during the SIMOPS event or inside the DD III or the Discoverer Enterprise 500-m zone (see details in the 500-m Zone Practice). A critical repair is defined as repair that could lead to single point failure and loss of station or vessel integrity.**

6.9 Aviation

The air command in Houma is an integrated part of the SIMOPS plan. The following types of air activities are expected:

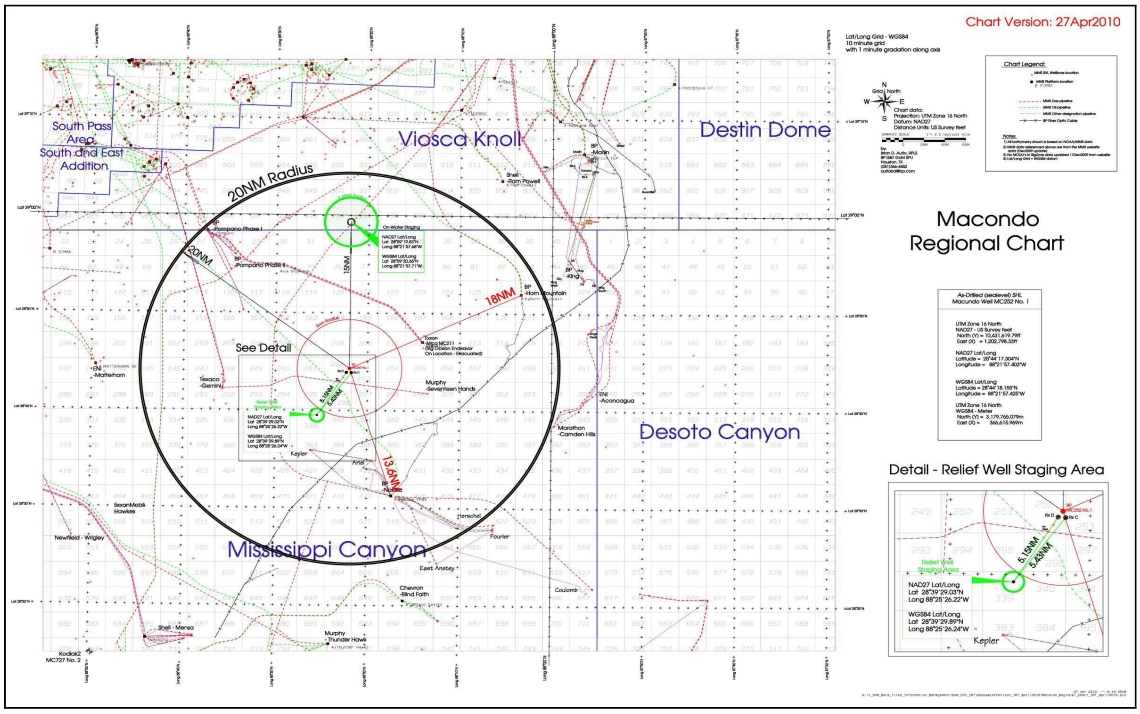
1. Helicopter crew flights to drilling rigs and source control vessels.
2. Spotter planes and fixed wing surveillance
3. Areal spray of dispersants (four aircrafts in one dispersant sortie, four to five sorties per day).
4. Over-flights of fixed wing and helicopters.
5. Drone surveillance.
6. Press and media.

The MC252 area has a restricted airspace (TFR – Temporary flight restriction) of 20-nm from site up to a 4,000-ft. elevation. Flights inside this zone are controlled by the USCG cutter Harriet Lane on site. The air command in Houma plans all flights to the site and reports through the SIMOPS Director as shown in Figure 1, page 8.

6.10 Helicopter Fueling

Helicopter fueling operations will mainly take place onshore. The aviation group will arrange emergency fueling onboard offshore facilities if needed. It is emphasized, however, that using the Discoverer Enterprise and the DD III as fueling stations for non rig flights reduces the efficiency of the drilling operations because of shut-down of cranes and deck activities.

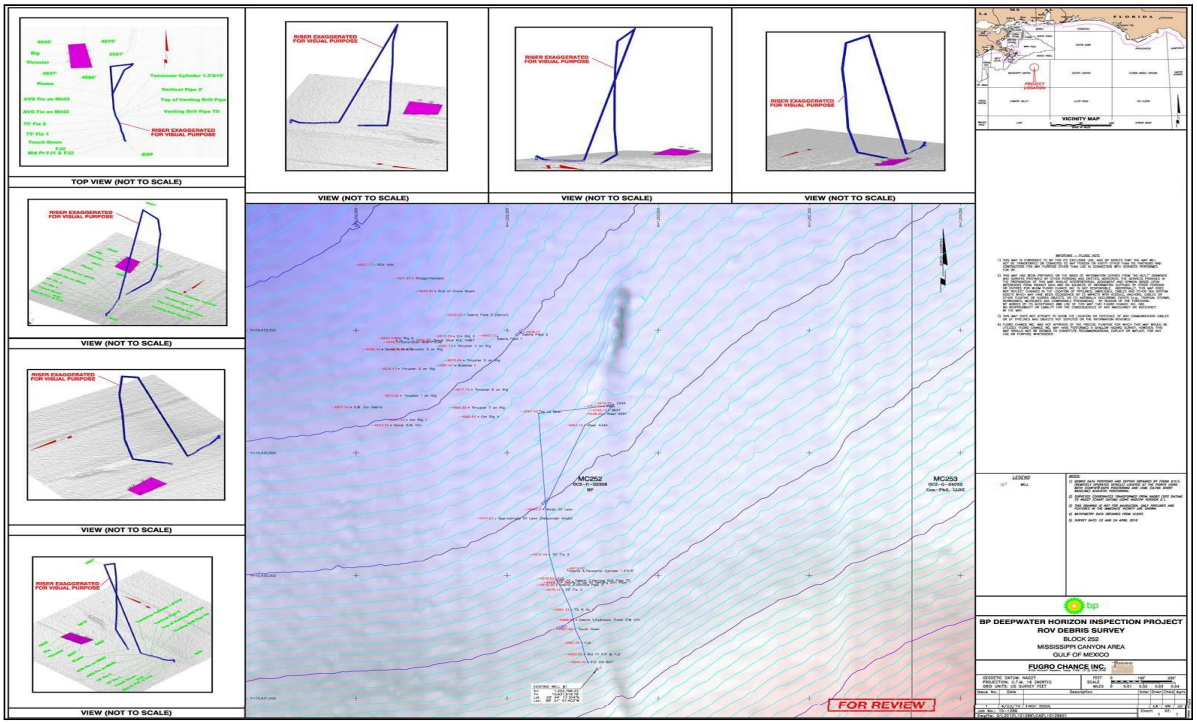
Figure 5: MC-252 Incident Regional Chart With 20-nm Restricted Zone



Title of Document:	Macondo Relief Well SIMOPS Plan	**Document Number:**	2200 T2 DO PN 4001
Authority:	Houston Incident Commander	**Revision:**	1
Custodian/Owner:	Geir Karlsen	**Issue Date:**	4/30/2010
Retention Code:	ADM3000	**Next Review Date (if applicable):**	N/A
Security Classification:	Project Confidential	**Page:**	Page 30 of 55
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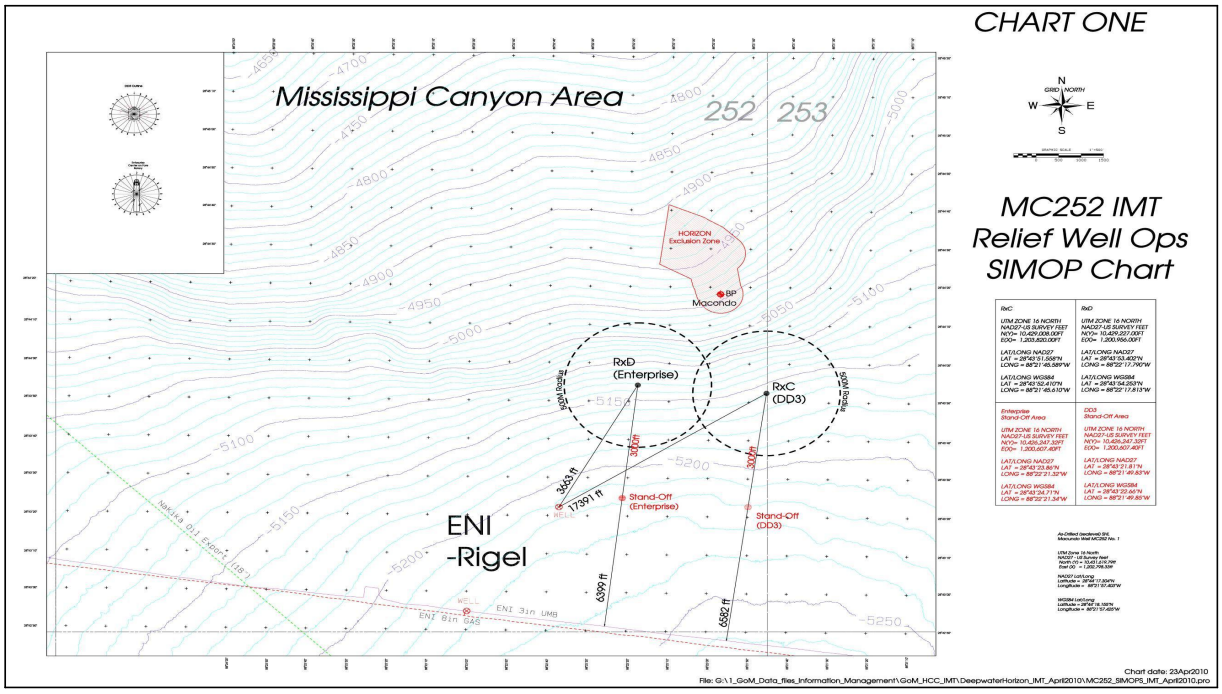
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Figure 6: MC-252 Incident Marine Debris Map



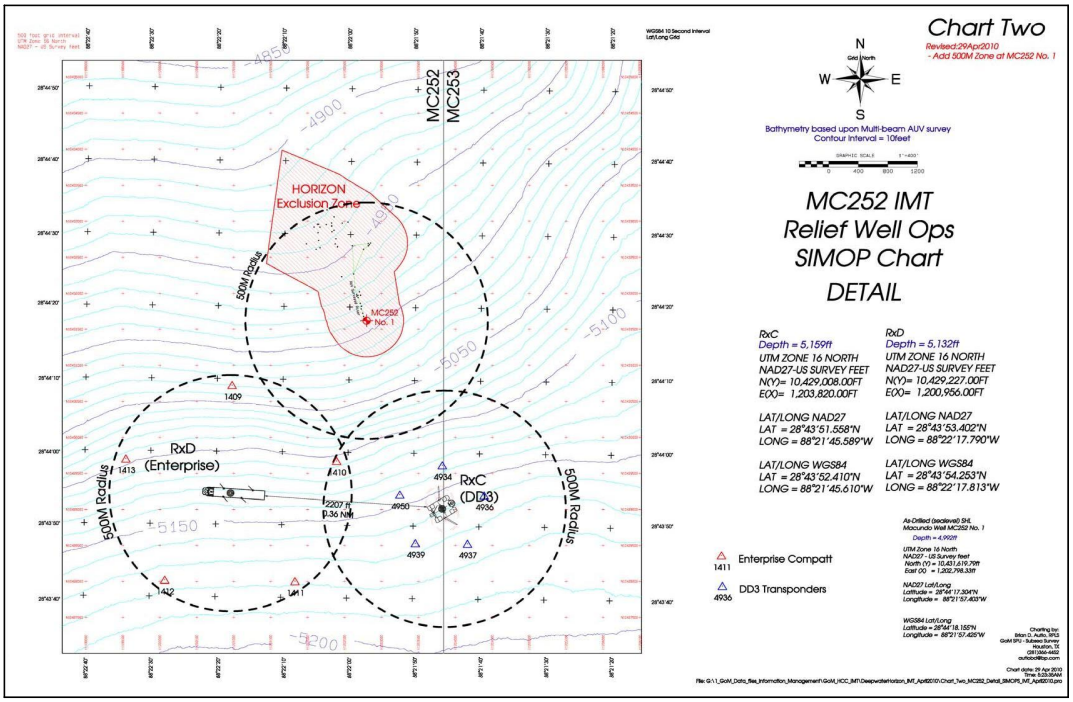
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Figure 7: Marine Debris and Discoverer Enterprise/DD III 500-m Exclusion Zones



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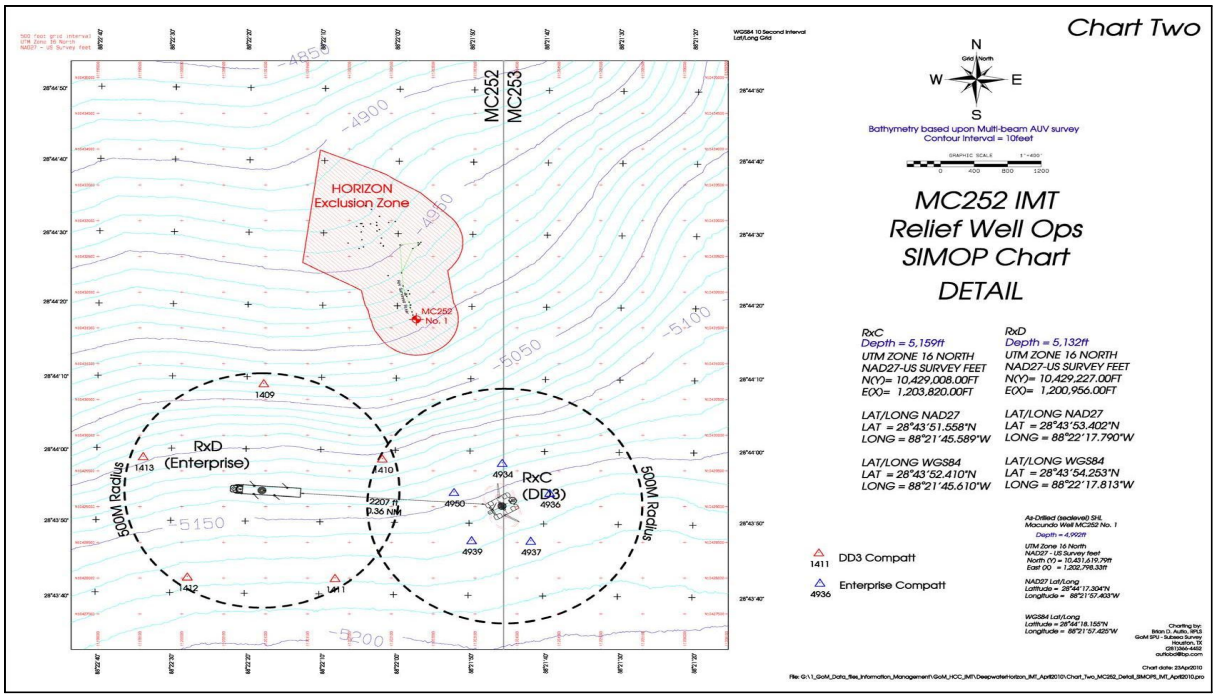
Figure 8: 500-m Vessel Exclusion Zone Detailed Map



Note The Offshore Vessel Source Control SIMOPS Coordinator controls the debris field and an area within appr 1,000 m of the MC 252 no 1 well site

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Figure 9: Discoverer Enterprise and DD III Transponder Grids



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Figure 10: Field Frequency Management Plan HiPAP vs. Sonardyne Digital

1 Discoverer Enterprise DP Array s now operating with Sonardyne MK5 Wideband COMPATTs The array is setup for Family 14 C00
LBL arrays installed at Thunder Horse must avoid allocating this fam ly to remain clash free with the Discoverer Enterprise

			KONGSBERG H PAP			SONARDYNE TONE CHANNELS																			
						CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	C F	CCF	CRF	CH0	CH9	DCF	CH10	CH11	CH12	CH13	CH14	
VESSEL ALLOCAT ON	CH #	OPERATING CONDITIONS / PARAMETERS	TX1	TX2	RX	19230	19841	20491	21186	21929	22522	23148	23810	24752	25510	26042	26882	27472	28090	28735	29411	30120	30864	31645	
DO NOT USE	b13	DO NOT USE	21000	21500	29250				X												X				
DO NOT USE	b14	DO NOT USE	21000	22000	29750				X	X															
DD III (VESSEL 3)	b14	Tracking	21000	22500	30250				X		X											X			
DO NOT USE	b15	DO NOT USE	21000	23000	30750				X			X											X		
OI 3 (VESSEL 4)	b16	TRACK NG	21000	23500	27250				X									X							
DO NOT USE	b17	DO NOT USE	21000	24000	27750				X				X					X							
BOA SUB C (VESSEL 1)	b18	SPARE	21000	24500	28250				X					X					X						
SKANDI NEPTUNE (VESSEL 5)	b21	TRACK NG	21500	21000	28500				X											X					
OI 3 (VESSEL 4)	b23	TRACK NG	21500	22000	29500					X											X				
BOA SUB C (VESSEL 1)	b24	CRANE 1	21500	22500	30000						X											X			
SKANDI NEPTUNE (VESSEL 5)	b25	TRACK NG	21500	23000	30500							X													
BOA SUB C (VESSEL 1)	b26	DP 1	21500	23500	27000												X								
MISS GINGER (VESSEL 2)	b27	EMERGENCY AUV	21500	24000	27500								X					X							
DD III (VESSEL 3)	b28	Tracking	21500	24500	28000									X					X						
DD III DP	b31	DP	22000	21000	28750				X	X										X					
DD III DP	b32	DP	22000	21500	29250					X											X				
DD III (VESSEL 3)	b34	Tracking	22000	22500	30250					X	X											X			
DD III DP	b35	DP	22000	23000	30750					X		X											X		
OI 3 (VESSEL 4)	b36	TRACK NG	22000	23500	27250					X								X							
DD III DP	b37	DP	22000	24000	27750					X			X					X							
BOA SUB C (VESSEL 1)	b38	MILL 36	22000	24500	28250					X				X					X						
SKANDI NEPTUNE (VESSEL 5)	b41	TRACK NG	22500	21000	28500				X		X									X					
MISS GINGER (VESSEL 2)	b42	AUV	22500	21500	29000						X									X					
OI 3 (VESSEL 4)	b43	TRACK NG	22500	22000	29500					X	X										X				
SKANDI NEPTUNE (VESSEL 5)	b45	TRACK NG	22500	23000	30500						X	X													
BOA SUB C (VESSEL 1)	b46	SPARE	22500	23500	27000						X						X								
MISS GINGER (VESSEL 2)	b47	SPARE	22500	24000	27500						X		X					X							
DD III (VESSEL 3)	b48	Tracking	22500	24500	28000						X			X					X						
DO NOT USE	b51	DO NOT USE	23000	21000	28750				X			X								X					
DO NOT USE	b52	DO NOT USE	23000	21500	29250							X									X				
DD NDY (SSE)	b53	DO NDY USE	23000	22000	29750					X		X													
DD III (VESSEL 3)	b54	Tracking	23000	22500	30250						X	X										X			
OI 3 (VESSEL 4)	b56	TRACK NG	23000	23500	27250							X						X							
DO NOT USE	b57	DO NOT USE	23000	24000	27750							X	X					X							
BOA SUB C (VESSEL 1)	b58	M LL 36 SPARE	23000	24500	28250							X		X					X						
SKANDI NEPTUNE (VESSEL 5)	b61	TRACK NG	23500	21000	28500				X											X					
MISS GINGER (VESSEL 2)	b62	SEABIRD	23500	21500	29000															X					
OI 3 (VESSEL 4)	b63	TRACK NG	23500	22000	29500					X											X				
BOA SUB C (VESSEL 1)	b64	CRANE 2	23500	22500	30000						X											X			
SKANDI NEPTUNE (VESSEL 5)	b65	TRACK NG	23500	23000	30500							X													
MISS GINGER (VESSEL 2)	b67	SPARE	23500	24000	27500								X					X							
DD III (VESSEL 3)	b68	Tracking	23500	24500	28000									X					X						
DO NOT USE	b71	DO NOT USE	24000	21000	28750				X				X							X					
DO NOT USE	b72	DO NOT USE	24000	21500	29250								X								X				
DD III DP	b73	DP	24000	22000	29750					X			X												
DD III (VESSEL 3)	b74	Tracking	24000	22500	30250						X		X									X			
DO NOT USE	b75	DO NOT USE	24000	23000	30750							X	X										X		
DD III DP	b76	DP LIC	24000	23500	27250								X					X							
BOA SUB C (VESSEL 1)	b78	MILL 37	24000	24500	28250								X	X					X						
SKANDI NEPTUNE (VESSEL 5)	b81	TRACK NG	24500	21000	28500				X					X						X					
MISS GINGER (VESSEL 2)	b82	SPARE	24500	21500	29000									X						X					
OI 3 (VESSEL 4)	b83	TRACK NG	24500	22000	29500					X				X							X				
BOA SUB C (VESSEL 1)	b84	M LL 37 SPARE	24500	22500	30000						X			X								X			
SKANDI NEPTUNE (VESSEL 5)	b85	TRACK NG	24500	23000	30500							X		X											
BOA SUB C (VESSEL 1)	b86	DP 2	24500	23500	27000									X			X								
MISS GINGER (VESSEL 2)	b87	SPARE	24500	24000	27500								X	X				X							

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Figure 11: HazID Rig Exposure to Oil Sheen or Plume Rig Operations

						Severity				Pre Mitigation					Severity				Post Mitigate										
Phase	Hazard	Hazard Scenario	Causes	Consequences	Safeguards	Safety	Environmenta	Financial	Reputation	Frequency	Safety	Environmenta	Financial	Reputation	Risk	Actions / Mitigation Measures	Safety	Environmenta	Financial	Reputation	Frequency	Safety	Environmenta	Financial	Reputation	Risk	Assigned Individual	Dates	Comments
Operating Rig	Oil Sheen	The resu ts of the TOI internal HAZID were reviewed and accepted by the team Included as a separate logsheet														*No additional mitigations recommended*												Note; the rig vessel master will have a conversation with the source vessels in field on their experience working the area with an oil sheen Note Vessels need a plan to flush ba last tanks prior to incident demobilization to remove any oily water n ballast tanks	
	Plume	Plume of concentrated oil comes up right under the rig	Flow increases to a catastrophic rate A potential cause, among others, could be fa lure of BOP stack	environmental, financial	Subsea visual, real time, monitoring of the well s te area (three vessels w th multiple ROV's) Existing TOI emergency procedures	D		E		3	D3		E3			Develop a decision matrix for various scenarios of increased oil flow that could impact the drill rig	E		E		3	E3		E3		George Gray		No	
																Include in IAP that source control immediately commun cates any flow changes to the SIMOPS Director										Troy Endicott			
																Develop a model to predict plume location based on subsea currents Consider the impact of rapidly increasing flow rate										Troy Endicott		Note The rig response is partially based on having knowledge of expected plume location	
	Emulsion / Mousse															Determine the locat on and density of oil/water emulsion / mousse floating below the surface										Troy Endicott		Note The rig response is partially based on having knowledge of expected locat on of any emulsion/mousse	
																Convey IMT air monitoring and safety plan to the vessels										Joe Neumeyer			

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Figure 12: HazID Rig Exposure to Oil Sheen or Plume Other Issues

						Severity					Pre Mitigation						Severity					Post Mitigate							
Phase	Hazard	Hazard Scenario	Causes	Consequences	Safeguards	Safety	Environmental	Financial	Reputation	Frequency	Safety	Environmental	Financial	Reputation	Risk	Actions/Mitigation Measures	Safety	Environmental	Financial	Reputation	Frequency	Safety	Environmental	Financial	Reputation	Risk	Assigned Individual	Dates	Comments
Moving to relief well sites	No unique hazards identified				SIMOPS Plan is guidance document for green light to move in AUV survey to confirm no interferences at the relief we l sites																								
Met ocean					Seasonably favorable winds and currents should keep s ick away from rigs Historically loop currents move away from relief well dri l locations Loop currents are monitored da ly																								
		Hurricane			Existing hurricane plans																					Troy Endicott			
Source Control vessels		Lose ROV and view of source			Three vessels with ROV's are onsite																								
		Acoustic conflict			SIMOPS plan defines resolution process																								
Vessels in 500 meter zone		Spi l response vessels moving into the rig 500 meter zone			SIMOPS plan includes 500 meter zone requirement											Send 500 meter zone to branch directors											Troy Endicott		Note: The sp ll response vessels may be less familiar with the 500 meter zone practice It is also in the SIMOPS Plan
	Dead vessel NGO's media	Vessel in the area has blackout	equipment failure	Potential vessel co lision	SIMOPS plan includes 500 meter zone requirement Vessel security plans JIC (joint information center) to support communications																								
		Oil washes on deck of supply boat going to the rig			Supply boats avoid transit through o l slick f possible They are offloaded on the lee side of the rig and have existing cleaning procedures Note: the supply vessels have decon procedures for leaving the area																								
Dispersant Application					Rigs would have little if any exposure Airspace is managed outside the rigs											Communicate to the IMT the drill rigs request to maintain a minimum of one mile distance for dispersant application or in situ burning											Troy Endicott		
n situ burn					Burning is not planned to be done close to the rigs																								

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Figure 13: HazID Log Rig Exposure to Oil Sheen or Plume

HAZID Log

Node 1 : DDIII & DEN operating on Macondo (MC 252)

Operation	Hazard	Preventive Controls	Consequences	Mitigating Controls	Risk Ranking: Personnel	Risk Ranking: Loss of Containment	Risk Ranking: Property Damage	Risk Ranking: Risk	Additional Safeguards	Residual Risk: Personnel	Residual Risk: Loss of Containment	Residual Risk: Property Damage	Residual Risk: Risk	Comments
Operating rig with oil sheen present.	Oily water sucked up into thruster ch ller units	Ballast down as low as reasonably practicable DDIII Ba last down to Operating draft prior to moving onto MC 252 Take samples through strainers during rounds	DEN Overheating and going into power reduction mode DDIII Minimal exposure	DEN Continuously monitored Can isolate 1 aft and 1 fwd while being serviced depending on the weather DDIII Continous monitoring 2 independent loops w/ 3 heat exchangers each Can put ones needing to be serviced on standby Can monitor pressure & temperature differential via VMS Can acid wash offline heat exchanger			Ent B4 DD III B4							
	Oily water in heat exchangers (thruster motor, main engines, rig air compressor, thruster steering, thruster lube oil, AC units)	Ballast down as low as reasonably practicable DDIII Ba last down to Operating draft prior to moving onto MC 252 Take samples through strainers during rounds	DEN Overheating and potential engine shutdown DDIII Minimal exposure	DEN Continuously monitored Has 2 SW cooled Heat Exchangers for Main Engines 1 as spare, and 1 as backup DDIII Continous monitoring 2 independent loops w/ 3 heat exchangers each Can put ones needing to be serviced on standby Can monitor pressure & temperature differential via VMS Can acid wash offline heat exchanger			Ent B4 DD III B4							
	Oily water in drawworks cooling unit	Ballast down as low as reasonably practicable DDIII Ba last down to Operating draft prior to moving onto MC 252 Take samples through strainers during rounds	Drawworks cooler unit overheating	DDIII 3 individual heat exchangers for Drill Floor equipment Can take 1 offline to clean DEN Has 2 for DWX cooling Can monitor and service wh le 1 offline			Ent B4 DD III B4							

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7 References

7.1.1 BP

- MC-252 Incident Offshore Coordination SIMOPS Guidelines

7.1.2 Transocean (TOI)

- See TOI DEN and DD III HSE Plans
- TOI WSOC for DEN and DD III
- TOI Operations Manual
- TOI Floating Operations Manual HQS-OPS-004, Section 4, Subsection 11: DP Operations Guidelines – Close Proximity Operations.
- DEN DP Capability Plots
- Development Driller III DP Capability Plots

7.2 Other References

7.2.1 BP

- GoM MC-252 Incident Management of Change Plan
- BP GoM TOI HSE Management System Bridging Document
- Emergency Response Plan (ERP) Document Number: 1440-85-OP-PR-0005
- GoM Safe Practices Manual (SPM) – GoM Incident Notification, Reporting and Investigation Procedure. Document Number: CD # UPS-US-SW-GOM-HSE-DOC-00115-2
- GoM IMS Vol II – Regional Oil Spill Plan
- GoM IMS Vol III – Severe Weather Contingency Plan
- GoM Contract Aircraft Guidelines
- GoM Diving Procedures
- GoM Operational Guidelines for Offshore Support Vessels
- GoM DEN Operations Manual
- 500-m Zone Practice – BP Marine
- VOI – Vessel Operating Instructions – BP Marine
- Fan Beam User Manual v. 4.1
- DMAC (Diving Medical Advisory Council) dated 1979

Appendix A: Contact Details – MC-252 Incident

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Emergencies and Regulatory			
Terrebonne General Medical Center 8166 Main Str. Houma	(985) 873-4141 Oper. (985) 873-4150 Emerg.		
US Coast Guard	(504) 589-6225 (985) 380-5320		
Houston Crisis Center **BP ICP – 24 Hour Number**	**(281) 366-0286 O** **(713) 208-6173 C** **(800) 321-8642** **(630) 961-6200**		
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SIMOPS Director			
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Oil Spill Response Command			
Smith, Stephen (O'Brian Group)	(866) 215-4586 (866) 292-1326	mops.lar.master@msrc.org smiths3663@hotmail.com	Oil Spill Response On-Scene SIMOPS Coordinator (onboard Louisiana Responder 866-292-1326)
Source Control Vessel Command			
Sepulvado, Murry	(318) 471-1763	sepulvmr@bp.com	Source Control
TOI Discoverer Enterprise			
Captain OIM Bridge / DPO Radio room BP WSL BP Clerk / dispatch BP Subsea	(832)-587-5530/5 (713) 587-5531 713-232-8245 ext. 2008 or 2007 (713) 232-8245 (281) 366-4504 or (281) 366-4506 (281) 366-4515 (281) 366-4536	captain.den@deepwater.com Oim.den@deepwater.com dpoperator.den@deepwater.com Sat Telephone Bridge (voice): 0-11-870-353-830-551 Sat Telephone Radio Room (voice): 0-11-870-353-830-550 Iridium Sat Phone: 1-480-768-2500 code 8815-4147-9794 Radio Frequency Ch 12 VHF (MHz) - 156.650	

Name	Telephone	E-Mail	Title
Port and Stb. ROV	(713) 232-8245 ext. 2229	Radio Frequency Ch 16 VHF (MHz) - 156.800 Helicopter VHF (MHz) – 123.050 Call Sign V7HD3	
TOI Development Driller III			
DD III Well Site Leader Radio Rm. DD III Inmar Sat DPO Captain BP Dispatcher	**713-336-8218** 832-587-6871 Dial 0 for operator 011 870 764449920 x-203 and x-204 x-206 713-336-8215 713-336-8229 713-336-8201	dd3wellsiteleader@bp.com dpoperator.dd3@deepwater.com mil80@oceaneering.com Mil14@oceaneering.com	
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Deepwater Receiving Shipping Shore base manager Marine Dispatcher Production	(337) 735-5702 O (337) 735-5715 O (337)-735-5703 O 337-735-5714 O 985-396-2467 C 337-735-5712 O	Mailing address Fourchon Base: Fourchon Base Address: BP / C-Port 1 106 9th st. Lot #1 Golden Meadow, La. 70357 PH # 337-735-5708	
Air Logistics	337-365-6771		
PHI (Houma)	985 868 1705	Mailing Address: PHI Heliport 3622 Thunderbird Rd Houma, LA 70363 Ph.: (337) 735-5351	
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Vessels			
Source Control Vessels			
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BOA Sub C	832-461-8266 Client Office 832-461-8269 owner office	captain@boasubc.no	
Boa Deep C	203-575-5434 client office 203-575-5431 owner office 203-575-5437 Bridge	offshore-supervisorbdc@boa.no	
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Pipeline Control Center			
Tulsa Control Center	(918) 660-4451	billy.sherrard@bp.com guy.proctor@bp.com kevin.arrington@bp.com raymond.jones@bp.com william.b.todd@bp.com roger.easterling@bp.com	Tulsa Control Center contacts all facilities during an emergency.
Updated April 28, 2010			

R/V Weatherbird II Cruise Plan (DRAFT)
Subsurface Oil Cruise, May 21-28, 2010

Funding Agency: Deepwater Horizon Unified Command (contact: David Palandro); National Marine Fisheries Service (contact: Dr. Steve Murawski)

Principal Investigators: Ernst Peebles, David Hollander, USF College of Marine Science (USF-CMS); Robert McMichael, Jr., Florida Fish and Wildlife Research Institute (FWRI)

Scientific Crew:

Ernst Peebles, USF-CMS (Chief Scientist)
Greg Ellis, USF-CMS
Elon Malkin, USF-CMS
Andrew Warren, USF Center for Ocean Technology (USF-COT)
Mike Singer, FWRI
Chris Musselman, FWRI
Bill Habich, FWRI
NOAA representative (TBD)
BP representative (TBD)

Schedule:

Departure from St. Petersburg: 1000, May 21, 2010
Conduct science operations: (refer to specifics below)
Return to St. Petersburg: May 26, 2010. Optional return dates extend to May 28.

Station Positions (see Fig. 1):

Station	Latitude North (deg min sec)	Longitude West (deg min sec)	Depth (m)
LCG01			
DSH01	27 29 02	86 06 16	3000
DSH02	28 03 10	86 06 16	1000
DSH03	28 38 57	86 06 16	400
DSH04	28 03 44	86 52 48	2000
DSH05	28 43 02	86 52 48	1000
DSH06	29 11 21	86 52 48	400
DSH07	29 24 12	87 52 09	400
DSH08	29 10 44	87 52 09	1000
DSH09	28 35 24	87 52 09	2100
DSS01	28 37 22	87 39 59	2000
DST01	29 01 48	87 21 16	1000
DSS02	28 08 22	87 06 56	2500
DST02	28 07 50	86 29 40	1000
DSS03	27 30 59	85 42 00	2500
DST03	27 32 56	85 19 06	1000

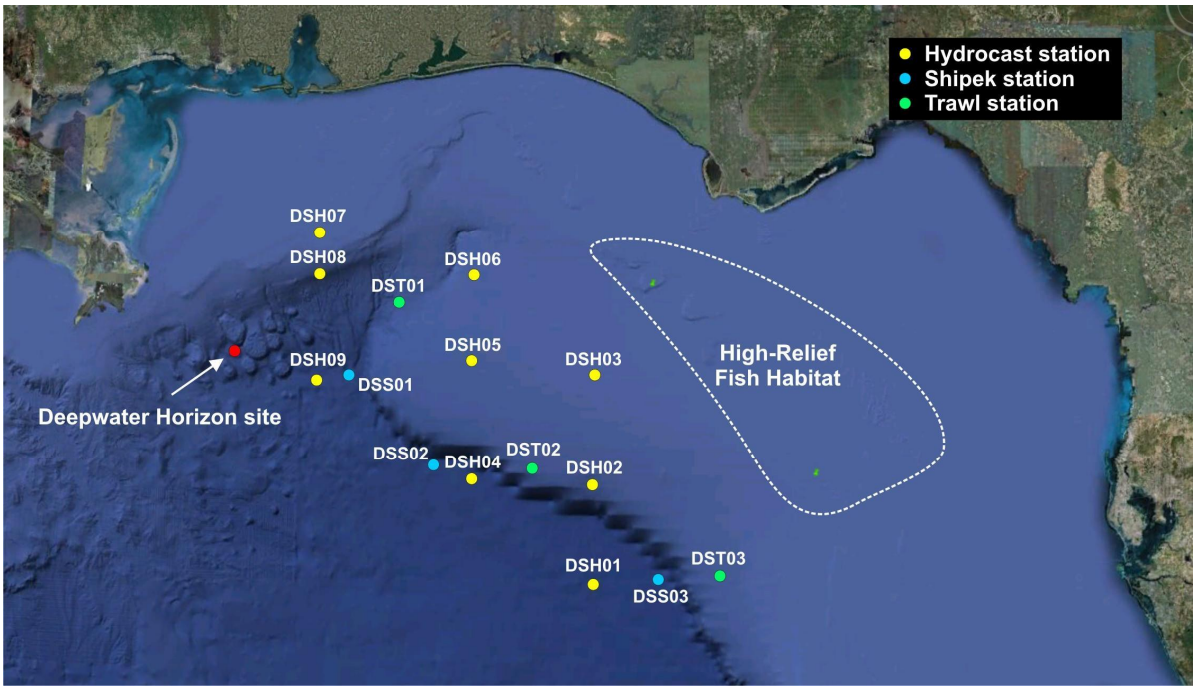


Figure 1. Station locations (Google Earth background image). The position for station LCG01 (glider deployment) is adaptive and is not shown.

Objectives.

1. To detect subsurface oil in waters east of the Deepwater Horizon explosion site as these may pertain to sensitive high-relief habitats on the outer West Florida Shelf (Madison-Swanson, the Edges, Steamboat Lumps, the Middle Grounds).

2. To deploy gliders equipped with CDOM fluorometers in oiled waters associated with the 0-200 m upper layer of the Loop Current and adjacent waters.

3. To obtain specimens representing the deep-slope community for oil-spill toxicology analysis.

Science Operations.

Objective 1. The principal method for addressing objective 1 is to conduct 20-liter Niskin bottle hydrocasts from bottom to surface at three isobaths for each of three lines of longitude (9 total deep-slope hydrocast stations, DSH_X). Station isobaths (m) will be 400 (50 m intervals), 1,000 (100 m intervals), and 3,000 (100 m intervals to 1000 m and 500 m intervals thereafter). In addition, surface samples will be collected using a plastic bucket (35 samples per line of longitude and 105 samples total). 700-800 ml water subsamples will be withdrawn from each

Niskin-bottle sample for storage at 1-4 degrees C after addition of 1 ml of 6N HCl. An additional 500 ml subsample will be analyzed using a WET Labs BBFL2 fluorometer (Excitation/Emission: 370/460 nm) to evaluate CDOM fluorometry as a rapid assessment technique for detecting oil-spill hydrocarbons. The fluorometry subsamples will be discarded after analysis. An effort is underway to incorporate 50 kHz sonar data into this rapid assessment technique. In recognition that oil and seawater may be miscible at depth and immiscible at surface pressures, all unused sample water remaining in the Niskin bottle will be examined within a 20-liter glass container before being discarded. Separated (floating) oil detected during this process will be stored in a separate 1-liter bottle and treated as the 700-800 ml water subsamples above. All 1-liter sample bottles used in the hydrocast effort are new, amber glass bottles that have been triple rinsed with DI water, then rinsed with methanol, and given a final rinse with hexane. Bottle closures will be plastic-lined screw-on plastic caps applied over an aluminum-foil barrier. There will be 200-300 ml of headspace in each hydrocast sample. After return to St. Petersburg, sample processing will be conducted by a NELAC-certified lab.

Objective 2. A Slocumb glider equipped with a WET Labs CDOM fluorometer will be launched in clean water at or near site LCG01, where it will follow a programmed 0-200 m yo-yo course northward into entrained oil associated with the Loop Current and will then continue northward into an area where upwelling is suspected. From there it will turn east to conduct a transect through the Loop Current and onto the West Florida Shelf, where it will be retrieved by the R/V Fish Hawk (USF-COT). Partial data uploads will be made at 2-6 h intervals, depending on yo-yo frequency. The glider is also equipped with a CTD. Additional subsamples will be used to describe various properties described in the Objectives. The latter analyses will be conducted by various groups at USF-CMS and FWRI.

Objective 3. 30 ft. otter trawls will be deployed once at stations DST01, DST02, and DST03 on the return trip to St. Petersburg. Whole specimens for toxicology analysis will be wrapped individually in aluminum foil and stored frozen until analysis. Analysis will be the responsibility of FWRI. Three shipek sediment samples will be collected opportunistically on the return trip (stations DSS01, DSS02, DSS03). Approximately 400 ml of sediment from each Shipek station will be kept at 1-4 degrees C (no HCl addition) for chemical analysis. The remaining volume will be measured and sieved through 500 micron mesh to retain benthic macroinvertebrates, which will be preserved in 5-10% formalin in seawater.

			Office Phone	Cell Phone
NOAA Fisheries Science				
	Role: Research Cruise Planning and Coordination			
	Bonnie Ponwith	SEFSC Director	305-361-4264	
	Lisa Desfosse	Pascagoula Lab Director	228-762-4591 X1602	
	Perry Thompson	SEFSC Vessel Coordinator	228-762-4591 X1667	
***	Charles Thompson	Acoustics Researcher	228-668-2097	
	Karen Mitchell	Research Fishery Biologist	228-549-1665	
***	Russell Brown	Field Party Chief	508-495-2380	774-392-4090
NOAA Fisheries / OAR				
	Role: MOKNESS Sampling			
	Aki Shiroza	NOAA Fisheries Contractor	305-361-4246	
***	Shailer Cummings	OAR/AOML	305-361-4385	
***	Glenn Zapfe	NOAA Fisheries Contractor	228-549-1650	
Monterrey Bay Aquarium Research Institute (MBARI)				
	AUV - GULPER Sampling			
***	Hans Thomas	AUV Group Leader	831-869-5693	
***	Yanwu Zhang	Senior Research Specialist	831-775-2028	
***	Erich Rienecker	Ocean Observatory Technician	831-775-1854	
	MBARI Cell			831-915-7128
University of New Hampshire				
	EK-60 Monitoring & Visualization			
***	Tom Weber	Research Assistant Professor		814-360-7523
***	Sam Greenaway			
University of South Florida				
	SIPPER Sampling			
***	Dr. Andrew Remsen	Project Leader	727-553-1647	727-259-4836
	Dan Han			727-421-0724
	Tom Moore	NOAA Restoration Center	727-551-5716	727-647-6538
Woods Hole Oceanographic Institute				
	Water/Oil Chemistry			
***	Robert Nelson		508-289-3452	
ENTRIX				
***	TBD			
EPA				
***	TBD			
Accounting for Oil Spill Response			30-21-0000-00	28LDHE1-P00

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Sub-Surface Oil Monitoring Cruise

Commanding Officer
NOAA Ship *Gordon Gunter*

CRUISE PLAN
NOAA Ship *Gordon Gunter* Cruise GU-10-02

I. Overview

A. Cruise Period: May 25, 2010 – June 8, 2010

B. Operating Area: Gulf of Mexico – Boundaries of the oil wellhead

C. Summary of Objectives:

1. ***Primary Objectives***
 a. Validate the use of acoustics using EK-60 to detect sub-surface oil plumes.
 i. Characterize the vertical and horizontal distribution of subsurface oil plume near the oil wellhead.
 ii. Identify oil particle size distribution and changes in oil characteristics as the plume is transported.
 b. Collect water samples in likely "target" areas to confirm the acoustic backscatter profile from the EK-60 are oil patches.
 c. Assess the occurrence, abundance and distribution of the early life stages of spawning fish in the boundary areas around the oil plume.
2. ***Secondary Objectives***
 a. Assess bluefin tuna larval abundance and distribution within the loop current, in relation to the oil plume.

D. Participating Institutions:

National Marine Fisheries Service- Pascagoula Laboratory, Miami Laboratory, Wood Hole Laboratory
University of New Hampshire
Woods Hole Oceanographic Institution
University of South Florida
MBARI
Others?????

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E. Personnel (Science Party)

Name	Title	Sex	Organization	Citizenship
LEG 1 (May 25 – June 8, 2010)				
Russell Brown	FPC	M	NOAA, Woods Hole	USA
Tom Weber	EK60 Biologist	M	UNH	USA
Andy Armstrong	EK60 Biologist	M	NOAA	USA
MBARI	Biologist		MBARI	USA
MBARI	Biologist		MBARI	USA
MBARI	Biologist		MBARI	USA
Ricker	Biologist			USA
Ricker	Biologist			USA
Ricker	Biologist			USA
Ricker	Biologist			USA
Charles Thompson	EK60 Biologist	M	NOAA , MS	USA
Glenn Zapfe	Plankton Biologist	M	NOAA , MS	USA
Aki	Plankton Biologist	M	NOAA , Miami	USA
Heath Cook	Biologist	M	NOAA, Woods Hole	USA

F. Administrative:

1. Points of Contact:
 Field Party Chief: Russell Brown, Northeast Fisheries Science Center, Russell.brown@noaa.gov
 Operations Officer: LT Kent Stein/ ENS Adrienne Hopper; NOAA Ship *Gordon Gunter*, 151 Watts Ave, Pascagoula, MS 39567; (228)327-7905; OPS.Gordon.Gunter@noaa.gov

2. Diplomatic Clearances: No diplomatic clearances are required.

3. Licenses and Permits:
 This cruise will be conducted under the following permits:
 Florida State Permit, Alabama State Permit, Mississippi State Permit, Louisiana State Permit, Texas State Permit, Southeast NMFS Regional Permit, Sea Turtle Permit, Marine Mammal Permit

II. Operations

A. Cruise Plan/Itinerary:
Itinerary:

Leg	Date	Location
1	May 25, 2010	Depart Pascagoula, MS
	June 8, 2010	Arrive Pascagoula, MS

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B. Staging and Destaging: PASCAGOULA/PASCAGOULA

C. Operations to be conducted:

Operational Plans:

NOAA Ship *Gordon Gunter* will depart Pascagoula, Mississippi on May 25, 2010 to conduct a survey to characterize the vertical and horizontal characteristics of the oil plume. The 16-day cruise will be conducted in one Leg.

NOAA Ship *Gordon Gunter* will collect acoustic backscatter profiles on the oil plume using the EK-60. It is anticipated that characteristic signatures of subsurface plumes can be identified at frequencies <30 kHz. Validation of the acoustic backscatter profiles will be conducted using water samples from Niskin bottles sampling at the depth of the backscatter profiles. A rosette using Teflon-coated Niskin bottles will be deployed to collect water samples, vertical temperature profiles, and other relevant environmental information. A CTD will not be used due to damage to sensors from immersion in oil.

Sampling with the EK-60 will be conducted using line transects beginning about 2 km from the oil wellhead and conducted in a 360 degree arc around the well to allow tracking of oil in all directions from the source. Transects will continue until the edges of the plume are identified and should be continued slightly past the edge of the plume to provide a picture of unperturbed vs. perturbed environments. If plumes of higher oil concentrations are observed, sampling will be conducted to attempt to follow these plumes beyond the search area, if necessary. At a minimum, five transects will be conducted and Niskin water bottle and/or CTD samples will be taken every 15 miles on each transect.

University of New Hampshire Joint Hydrographic Center scientists will process EK-60 transect data in real-time onboard the Gunter and will produce three-dimensional maps of backscatter density distribution. In situ water samples will be collected with the MBARI Upper Ocean Autonomous Underwater Vehicle ("Gulper") to assist in calibrating the EK-60. A Sonardyne Ultra Short Baseline (USBL) system will be used to track the AUV and an acoustic modem will be used to communicate with the vehicle.

Water samples will be collected in surface mixed layer (below surface to thermocline), for whole and dissolved polyaromatic hydrocarbons, volatiles, dispersant compounds and products of combustion. oil/sheen samples for fingerprinting and oil droplet size at transects across areas of known or suspected dispersed oil (from aerial application and subsurface injection) and areas of controlled burn. Samples will be taken to test for the presence of dispersed oil and droplet size. Water samples will be collected at four depths: just below the surface, mid mixed-layer (between thermocline/pycnocline and surface), just above the thermocline, and just below the thermocline, using a conventional hydrowire with 5 L Go Flow Bottles and a rosette sampling array with pre-programmed sampling depths.

Water samples will be tested for microbial analysis using a vacuum filtration and cryovial preservation techniques. This analysis will allow extraction of DNA to evaluate microbes in plume vs. non-plume waters.

Oil fluorescence will be tested using the Cyclops 7 configured in a pH meter mode that can test fluorescence of water samples in wide mouth jars.

Oil droplets will also be measured using the Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER), a towed, suspended particle imaging system. Results will be used to ground truth shipboard interpretations of EK-60 backscatter.

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The SIPPER system will also collect high resolution information on the distribution of zooplankton, phytoplankton, larval fish and detritus within a 100 cm^2 sampling area as it moves through the water. The SIPPER will also be used to determine the composition of scattering layers and their vertical extent. The SIPPER will be towed horizontally and vertically to determine the zooplankton and part of the icthyoplankton response to water possibly affected by the spill. The SIPPER towbody is outfitted with a SBE-19 plus CTD, SBE 43 Oxygen sensor, a Wetlabs Chl a and backscatter ECO fluorometer, a Wetlabs Wetstar transmissometer and a Wetlabs ECO CDOM fluorometer. SIPPER can deploy with all the sensors but a decision will need to be made whether to run with the transmissometer or the CDOM fluorometer as the CTD can only handle four external sensor inputs.

Plankton samples will be taken with the Multiple Opening and Closing Environmental Sampling System (MOCNESS) immediately beyond the margin of the plume but will not be conducted in any oiled areas. The MOCNESS tows will provide plankton collections for RNA analyses, and may serve as a proxy for likely biota within the adjacent waters within the plume area.

Upon completion of the characterization of subsurface oil plumes, adaptive sampling for bluefin tuna larvae will be conducted within the loop current, and, in particular, in areas identified as having surface or subsurface oil. Satellite imagery and acoustic backscatter profiles will be used to identify ichthyoplankton stations based upon a current larval bluefin habitat model. These stations will be sent to the ship along with the satellite imagery each day. Each station will consist of a CTD to 500 meters, a 10 minute subsurface neuston tow using the 505 mesh net, and a standard 10 minute neuston tow. The subsurface nesuton net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. This pattern will be repeated for 10 minutes. Flow meter reading will be recorded for the tow. At selected stations the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. All samples will be preserved in 95% ethanol in accordance with standard SEAMAP protocols

Communication between the deck sampling teams and the bridge on station will be accomplished via hand held radios. During rough weather, the watch leader with consultation from the ship's crew will determine if all sampling gear can be deployed safely. The Field Party Chief should be notified of any delays to sampling due to mechanical, medical or weather issues as well. The Chief Engineer should also be made aware of expected time of arrival at the first station so the salt water pumps can be turned on and ready for net washdown.

D. Sampling Methods

Niskin Bottles

Water samples will be collected using a rosette with 6-12 Teflon-coated Niskin bottles. The Niskin bottles will be lowered to the depth of the acoustic backscatter profile and samples collected at depths determined by the profile. A subset of the samples will be preserved according to NRDA chain of custody protocols for chemical analysis. A subsample of water samples will be placed in a wide mouth jar and tested for real time analysis for presence/absence of oil using the Cyclops 7 configured as a pH meter.

1 m MOCNESS Sampling

The Southeast Fisheries Science Center (SEFSC) will provide the 1 m MOCNESS and associated electronic equipment to record the environmental data. The MOCNESS will be deployed from the stern with the MOCNESS winch at the same location as the Niskin bottle collections. Prior to deployment, the ship speed should be maintained at 2 kt. However, once the MOCNESS is lowered into the water, the props should be disengaged to avoid damage by the ship's prop wash. The props can be reengaged once the watch leader has relayed to the bridge that the nets are at a safe depth. Once deployed, a series of 9 nets (0.505 mm mesh) can be opened independently at specific depths to obtain a discrete sample of that depth. For the oil plume characterization survey, depths will be determined based on the acoustic backscatter profile obtained by the EK-60. For the bluefin tuna larval survey, the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. The depth may be modified depending on the acoustic backscatter profile at the sampling station. Winch and ship speed will be manipulated by the watch leader through communication with the deck and bridge in order to filter a target volume of 250 m^3 for each net. The watch leader will let the bridge know when to disengage the props as the nets reach the surface during retrieval. After retrieval, samples will be rinsed into cod ends with seawater before bringing the MOCNESS on deck. Each oblique sample (surface to maximum depth) will be initially preserved in 10% formalin and transferred to 95% ETOH after 36 hours. The remaining nets will be initially preserved in 95% ETOH and transferred to fresh 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols chemical analysis.

MBARI Upper Ocean Autonomous Underwater Vehicle ("Gulper")

The "Gulper" will be deployed using the crane on the Gunter. The "Gulper" will be programmed for collecting water samples at discrete depths. Communication and tracking of the "Gulper" will be as follows:

The frequencies used for the Sonardyne USBLE and Benthos Acoustic Modems are Sonardyne WSM USBL Beacon HPR Channel H01 (also B01) with a reply frequency for H01 of 29.762kHz. This frequency can be easily changed if that particular channel is being used. The beacon receives the pulse from the ship transceiver at 20.492 kHz. The Benthos ATM-885 Modem is in the 9-14 kHz (2-6 km) range.

Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER)

The SIPPER will be towed horizontally and vertically to determine the zooplankton and part of the icthyoplankton response to water possibly affected by the spill. The SIPPER will be deployed on the Gunter's CTD cable to its maximum depth of 350 m in search of subsurface oil and possibly detect it visually, through its DO meter, CDOM sensor or transmissometer/backscatter sensors.. The SIPPER will be deployed off the Gunter with standard 0.322" conducting (3 conductor) cable and a slip ring. The system will be towed through the water at speeds between 1-4 knots and willn sample down to depths of 350 m. SIPPER tows require at least an hour per 100 m depth. The SIPPER system will conduct multiple tows in both impact and pre-impact waters at least 6 hours per/day. Exact station locations will be adaptively selected.

Cyclops 7

The Turner Design Cyclops 7 will be configured as a pH meter and will be used on the

deck to analyze water samples for oil fluorescence. A subset of water samples from Niskin bottles and the "Gulper" will be placed in wide mouth jars. The Cyclops 7 probe will be inserted into the jar to obtain a fluorescence reading.

Microbial Analysis

100-250 mil of water samples will be filtered through 0.22um pore size 25mm or 47mm diameter filters by standard vacuum filtration. The filter will be rolled into a labeled cryovial and frozen. DNA will be extracted from these filters to identify microbes present in plume and non-plume waters.

Neuston Sampling for Bluefin Tuna Larvae

The neuston net is a 1 x 2 m frame outfitted with a 505 mm mesh net. Each neuston tow will be conducted for 10 minutes. The neuston net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. If necessary, the ship should steam forward in a wide arc to keep the neuston net (mouth opening) out of the influence of the prop wash. The duration of a neuston tow may be shortened up to five minutes when there are high concentrations of jellyfish, ctenophores, Sargassum, floating weed and/or debris. After retrieval, plankton is rinsed into cod end with seawater while net hangs over side (if windy, watch leader may request net to be brought directly on board and rinsed on deck). Samples will be preserved in 95% ETOH initially and transferred to new 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols for chemical analysis.

III. Equipment

A. Equipment and Capabilities Provided by the Ship:

1. Because of the need for the Scientific Computing System (SCS) to populate the Fishery Scientific Computing System (FSCS), an Electronics Technician is imperative.
2. Hydrographic winch with wire and meter readout to accomplish Niskin bottle cast. Spare slip rings for each winch. Fully functional wire readouts for each winch.
3. ADCP

"Gulper" – What equipment is needed by the ship?

SIPPER – What equipment is needed by the ship?

1. Refrigeration for approximately 400 1 liter amber glass jars for 400 40 ml for volatiles (or about 100 at a time).
2. Storage for 8 coolers and freezer space for blue ice for maintaining sample temperature while in transit.

The SIPPER was developed for operation on most oceanographic vessels that carry standard 3 conductor 0.322" hydro-wire used for CTD and trawl operations. We utilize two conductors to operate a digital subscriber line (DSL) connection between the SIPPER and a personal computer on board the ship. We've operated on cable lengths up to 10 km long. Typically this hydro-wire is terminated with female Impulse RMG-2-FS connector or a female Impulse IE2F-5/8 connector. We have the capability to connect to either. If the cable is terminated differently, we

can either re-terminate the cable or build an adapter pigtail with the correct connectors. A winch with a payout speed and wire out indicator is preferred but not necessary.

The ship would need an A-frame that can lift a 250 lb tow-body and a block that could handle a 400 lb. dynamic load and clearance to lift a 3' wide, 5' long and 2' high tow-body. A working deck area at least 10' wide and long would be necessary for safely deploying and recovering the system.
The SIPPER is operated remotely through DSL link to a desktop computer on the ship. We would need space for an operator and computer as well as 120V AC to power the computer, DSL modem and other accessories. This space should be in proximity to the slip-ring conductors or a remote junction box. Additionally, as SIPPER is powered via battery, we would require a 3' by 2' area for a battery charging station and another 120V AC outlet.

4.

5. One (1) Primary SBE 9plus CTD configured as follows;
 a. Unit should be mounted horizontally and mounted in the water sampling frame. The frame should be examined to ensure it is in good physical condition and there are no breaks present in any of the welds supporting the frame.
 b. The standard 12 position SBE 32 Carousel should be properly mounted in the water sampler section of the frame and tested to ensure that all 12 bottle positions are working properly and respond to software requests for firing.
 c. The internal Digiquartz pressure sensor should be in good working order and have a calibration/service date not to exceed 365 days.
 d. The primary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 i. One (1) SBE 3 Premium Temperature sensor
 ii. One (1) SBE 4 Conductivity sensor
 iii. One (1) SBE 43 Dissolved Oxygen sensor
 iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
 v. One (1) Wetlabs Wetstar pumped fluorometer
 vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
 vii. One (1) Wetlabs C-Star transmissometer
 viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.
 e. The secondary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 i. One (1) SBE 3 Premium Temperature sensor
 ii. One (1) SBE 4 Conductivity sensor

iii. One (1) SBE 43 Dissolved Oxygen sensor
iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
v. One (1) Wetlabs Wetstar pumped fluorometer
vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

f. The unit should be properly terminated and connected to a properly functioning SBE 11 Deck Unit. The deck unit should be connected to allow the following:
i. Proper control of the SBE Water Sampler Carousel via the SEASAVE application.
ii. Integration of a proper NMEA signal from a GPS unit.

7. A second SBE 9plus profiler should be available as well. Unit does not have to be configured as a complete functioning ready-to-install on the sea cable unit; however, it should have the following components available:
a. Sensors for a Primary suite (with a calibration date as recent as possible, not to exceed 365 days):
i. One (1) SBE 3 Premium Temperature sensor
ii. One (1) SBE 4 Conductivity sensor
iii. One (1) SBE 43 Dissolved Oxygen sensor
iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
v. One (1) Wetlabs Wetstar pumped fluorometer
vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

b. Sensors for a complete Secondary suite (with a calibration date as recent as possible, not to exceed 365 days):
i. One (1) SBE 3 Premium Temperature sensor
ii. One (1) SBE 4 Conductivity sensor
iii. One (1) SBE 43 Dissolved Oxygen sensor
iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
v. One (1) Wetlabs Wetstar pumped fluorometer
vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
vii. One (1) Wetlabs C-Star transmissometer

viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

8. A second SBE 11 Deck Unit should be on the ship to be put into service if needed.
9. It is highly desirable to have the following additional spare sensors on-board if possible:
 a. One (1) SBE 43 DO Sensor
 b. One (1) SBE 3 Temperature Sensor
 c. One (1) SBE 4 Conductivity Sensor
 d. One (1) Wetlabs Wetstar pumped fluorometer
 e. One (1) Wetlabs C-Star Transmissometer
 f. One (1) SBE 5T Pump
15. Copies of all calibration sheets for CTD profilers, TSG, and spare sensors should be provided to the laboratories' Shipboard System Specialist prior to sailing.
16. CTD capable winch and J-frame for CTD casts, with sufficient electromechanical cable for casts to 500 m.
17. NMEA GPS input to CTD header file.

<u>The following data are requested of the SCS</u>

The SCS system should be fully operational for the duration of the survey. A listing of any sensors that will not be functional for the survey should be provided prior to sailing to the Field Party Chief, taking into consideration that event templates will have to be checked by the Shipboard System Specialists to ensure there will be no impact or an alternative sensor can be selected.

1. NorthStar 952X
 a. UTC time
 b. Latitude
 c. Longitude
 d. Speed over ground
 e. Course over ground
2. Furuno GP-90 GPS
 a. Latitude
 b. Longitude
 c. Speed over ground
 d. Course over ground
3. Sperry speed log
 a. Speed through the water
 b. Speed over ground
4. EQ50 and EK60 depth in meters
5. Gyro-heading
6. Air temperature (°C)
7. Corrected barometric pressure
8. True wind speed
9. True wind direction
10. SIMRAD ITI Trawl System (Temperature and Depth only)

11. Information should be passed to the Rotating ET to ensure the following:
 a. The Automatic Logger Control on the SCS Server must be enabled anytime ACQ is started and should use the default of 0:00:00 (Midnight GMT).
 b. The contents of the Eventdata folder should be allowed to remain present for the duration of the survey (they should not be deleted between legs). This will ensure that event IDs do not restart for the respective events during the survey.

SEASAVE SOFTWARE

Prior to sailing, the proper .CON files should be built in SEASAVE. The software should be set to look for the proper .CON file for the respective instrument.

It is also highly desirable that the ASCII Out function be allowed to feed CTD data into SCS via serial cable.

B. Equipment and Capabilities Provided by the Scientists:

Mississippi Laboratory

1. Flowmeters (6)
2. 1 m MOCNESS frame, (9) 0.505 mm nets, and electronic equipment
3. Conducting wire (5/8-in) and corresponding block for MOCNESS tows
4. Plankton sampling supplies box
5. Plankton preserving jars, lids and labels
6. Turner Designs 10-AU benchtop Fluorometer
7. Chemical transfer pumps
8. Formalin and ethyl alcohol
9. Triton (R) X-100
10. Methanol and filters
11. 6 Niskin bottles
12. 4 Garden hoses for washing down nets, nozzles, and hose repair parts
13. Plankton transfer table
14. 5 gallon buckets
15. Various clerical supplies
16. SIMRAD ITI Temperature/Depth Sensor
17. Spare batteries for the SBE 19 Seacat profilers
18. What supplies/equipment is needed for RNA analysis – need to check with Joanne

Need to get this together for the SIPPER, Gulper, oil analysis, microbial analysis, etc. – Need input from the scientists conducting this work.

Gulper –
2 SBE25 boardsets
2 SBE3 temperature sensors
2 SBE4 conductivity sensors

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Paroscientific pressure sensor (UCB4000)
SBE43 dissolved oxygen sensor
HobiLabs hydroscat 2 (fluorometer)
WetLabs ECO-CDOM Puck fluorometer
10 – 1.8 liter water samplers

Attachment 1: Description of Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER)

Mission of Work:
The Shadowed Image Particle Profiling and Evaluation Recorder is an /in-situ/ suspended particle imaging system capable of collecting high resolution information on the distribution of zooplankton, phytoplankton, larval fish and detritus. It uses a high speed line scan camera to continuously image a 100 cm^2 sampling area as it moves through the water. A typical 1 hour profile of the upper 100 m in the Gulf of Mexico can generate hundreds of thousands of plankton and detrital images. A comprehensive analysis software package is then used to extract, size, classify and manage the image and environmental data.

The SIPPER could also be used to determine the composition of scattering layers and their vertical extent. The SIPPER could be towed horizontally and vertically to determine the zooplankton and part of the icthyoplankton response to water possibly affected by the spill. The SIPPER towbody is outfitted with a SBE-19 plus CTD, SBE 43 Oxygen sensor, a Wetlabs Chl a and backscatter ECO fluorometer, a Wetlabs Wetstar transmissometer and a Wetlabs ECO CDOM fluorometer. SIPPER can deploy with all the sensors but a decision would have to be made whether to run with the transmissometer or the CDOM fluorometer as the CTD can only handle 4 external sensor inputs. The SIPPER could be deployed on the Gunthers CTD cable to its maximum depth of 350 m in search of subsurface oil and possibly detect it visually, through its DO meter, CDOM sensor or transmissometer/backscatter sensors.

SIPPER is a man portable system that is mounted on a small 5′×3′×2′ towed body that contains a conductivity, temperature and depth probe, a chlorophyll fluorometer, turbidity sensor and a transmissometer. It can be deployed off any ship with standard 0.322” conducting (3 conductor) cable and a slip ring. The system is towed through the water at speeds between 1-4 knots and can sample down to depths of 350 m. SIPPER tows require at least an hour per 100 m depth.

The objective would be conduct multiple tows in both impact and pre-impact waters at least 6 hours per/day. Exact station locations can be adaptively selected.

Names:
Dr. Andrew Remsen, University of South Florida, 727-259-4836

Roles:
SIPPER P.I.

Equipment Requirements:
The SIPPER is relatively small, self powered and requires very little footprint in a ship’s dry and wet areas. However, there are still some requirements necessary

for efficient operation of the system while at sea.

Winch, A-frame and tackle system

The SIPPER was developed for operation on most oceanographic vessels that carry standard 3 conductor 0.322" hydro-wire used for CTD and trawl operations. We utilize two conductors to operate a digital subscriber line (DSL) connection between the SIPPER and a personal computer on board the ship. We've operated on cable lengths up to 10 km long. Typically this hydro-wire is terminated with female Impulse RMG-2-FS connector or a female Impulse IE2F-5/8 connector. We have the capability to connect to either. If the cable is terminated differently, we can either re-terminate the cable or build an adapter pigtail with the correct connectors. A winch with a payout speed and wire out indicator is preferred but not necessary.

The ship would need an A-frame that can lift a 250 lb tow-body and a block that could handle a 400 lb. dynamic load and clearance to lift a 3' wide, 5' long and 2' high tow-body. A working deck area at least 10' wide and long would be necessary for safely deploying and recovering the system. The ship would need to be able to motor relatively slow and steady between 1-3 knots or have a trawl gear for best results.The length of cable available will determine the maximum depth we can deploy SIPPER to until we reach it's safe operation depth maximum at 350 m. At 350 m, typically 1500 m of cable is paid out. For this application, I foresee most work in the 50-100 m depth range.

SIPPER operation

The SIPPER is operated remotely through DSL link to a desktop computer on the ship. We would need space for an operator and computer as well as 120V AC to power the computer, DSL modem and other accessories. This space should be in proximity to the slip-ring conductors or a remote junction box. Additionally, as SIPPER is powered via battery, we would require a 3' by 2' area for a battery charging station and another 120V AC outlet.

Sample Requirements:
None

Proposal for NOAA NRDA Data collection for Deepwater Horizon Oil Spill
NOAA Vessel Gordon Gunter
Mary 25- June 8 2010
DRAFT

Mission: Support NOAA's Natural Resource Damage Assessment by collecting data and analytical samples to better quantify and model the distribution and weathering of oil (including dispersed and burned oil) released from the Deepwater Horizon platform. As part of this mission the NRDA team will also collect data from the Shadowed Image Particle Profiling and Evaluation Recorder to measure plankton presence and distribution. Data and samples collected by SEFSC scientists on the cruise will (collection and preservation of fish embryos and larvae according to NWFSC protocols) will be useful for future measurements of oil-related exposure and injury.

NRDA Personnel and roles:

Robert Nelson, Woods Hole Oceanographic Institution:
Water/Oil sampling chemist
RNelson@whoi.edu

Dr. Andrew Remsen, University of South Florida,
727-259-4836
SIPPER Principal Investigator

Entrix employee (TBD)

Off- ship scientific coordination and support:
Robert Ricker, NOAA

Activities:

Water samples: Collect water in surface mixed layer (below surface to thermocline), for whole and dissolved polyaromatic hydrocarbons, volatiles, dispersant compounds and products of combustion. oil/sheen samples for fingerprinting and oil droplet size at transects across areas of known or suspected dispersed oil (from aerial application and subsurface injection) and areas of controlled burn.

Samples will be taken to test for the presence of dispersed oil and droplet size. Water samples at depth will be taken with a rosette sampler that can collect multiple samples at various depths and collect large enough samples for chemical analysis. The samples for dispersant measurements will be collected in 1 L plastic bottles.

Whole water samples will be taken in 1L I-Chem Certified Clean amber glass jars and for VOA analysis. These samples will be analyzed for the full suite of PAHs and/or dispersant indicators and VOAs.

Water samples will be collected at four depths: just below the surface, mid mixed-layer (between thermocline/pycnocline and surface), just above the thermocline, and just below the thermocline, using a conventional hydrowire with 5 L Go Flow Bottles and a rosette sampling array with pre-programmed sampling depths.

Oil samples

Surface oil samples will be taken and placed in (cleaned) amber 125 mL bottles. Digital photography will be used to document surface oil appearance and thickness. Surface oil samples will be measured for water content (i.e., mousse), PAH content and biomarkers. Surface sheen and very fluid fresh oil samples will be collected with pre-cleaned Teflon nets attached to fishing weights by casting from the leeward side of the Jack Fitz with a conventional fishing pole. After the Teflon nets are drug through the sheen, they are sealed in 125 mL glass jars for shipment to the laboratory. Water content on mousse samples will be completed at the laboratory via Karl Fischer titration. PAH analyses will be completed by selected ion monitoring GC/MS and will include alkylated homologues as well as parent compounds. Biomarkers (steranes and triterpanes will be completed by selected ion monitoring GC/MS.

Oil droplet and plankton measurements

Oil droplets will be measured using the Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER), a towed, suspended particle imaging system.

The SIPPER system will also collect high resolution information on the distribution of zooplankton, phytoplankton, larval fish and detritus within a 100 cm^2 sampling area as it moves through the water.

Assistance with ichthyoplankton survey team (already on mission)

NWFSC scientists are providing reagentsand protocols to allow SEFSC staff to preserve ichthyoplankton samples to allow for future measures of exposure and injury to oil. Samples will need to be held under NRDA chain of custody.

Requirements for collection and maintenance of samples

1. Refrigeration for approximately 400 1 liter amber glass jars for 400 40 ml for volatiles (or about 100 at a time).

2. Storage for 8 coolers and freezer space for blue ice for maintaining sample temperature while in transit.

3. Requirements to support the SIPPER instrument are attached.

4. Ferry/supply boat will need to meet ship 4 day intervals to transport water samples under

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chain of custody to shore for packing and shipping to meet laboratory holding times (7 days from collection to extraction for water samples).

5. Sample collection methodology, handling, chain of custody and decontamination procedures will follow accepted standards to ensure the highest quality data will be collected. Discrete analytical samples will be tested at an approved lab(s).

Attachment:
SIPPER Information

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Sub-surface Oil Monitoring Cruise

Commanding Officer
NOAA Ship *Gordon Gunter*

CRUISE PLAN
NOAA Ship *Gordon Gunter* Cruise GU-10-02

I. Overview

A. Cruise Period: May 25, 2010 – June 8, 2010

B. Operating Area: Gulf of Mexico – Boundaries of the oil wellhead and within the loop current

C. Summary of Objectives:

1. ***Primary Objectives***
 a. Characterize the vertical and horizontal characteristics of subsurface oil near the oil wellhead and within the loop current.
 b. Identify changes in oil characteristics and transport of the oil plume.
 c. Collect water samples to confirm the acoustic backscatter profile from the EK-60 are oil patches.
 d. Assess the occurrence, abundance and distribution of the early life stages of spawning fish in the boundary areas around the oil plume.
2. ***Secondary Objectives***
 a. Assess bluefin tuna larval abundance and distribution within the loop current, in relation to the oil plume.

D. Participating Institutions:
National Marine Fisheries Service- Pascagoula Laboratory, Miami Laboratory
University of New Hampshire

E. Personnel (Science Party)

Name	Title	Sex	Organization	Citizenship
LEG 1 (May 25 – June 8, 2010)				
TBD				

F. Administrative:
1. Points of Contact:
Field Party Chief: TBD
Operations Officer: LT Kent Stein/ ENS Adrienne Hopper; NOAA Ship *Gordon Gunter*, 151 Watts Ave, Pascagoula, MS 39567; (228)327-7905;

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OPS.Gordon.Gunter@noaa.gov

2. Diplomatic Clearances: No diplomatic clearances are required.

3. Licenses and Permits:
This cruise will be conducted under the following permits:
Florida State Permit, Alabama State Permit, Mississippi State Permit, Louisiana State Permit, Texas State Permit, Southeast NMFS Regional Permit, Sea Turtle Permit, Marine Mammal Permit

II. Operations

A. Cruise Plan/Itinerary:
Itinerary:

Leg	Date	Location
1	May 25, 2010	Depart Pascagoula, MS
	June 8, 2010	Arrive Pascagoula, MS

B. Staging and Destaging: PASCAGOULA/PASCAGOULA

C. Operations to be conducted:
Operational Plans:

NOAA Ship *Gordon Gunter* will depart Pascagoula, Mississippi on May 25, 2010 to conduct a survey to characterize the vertical and horizontal characteristics of the oil plume. The 16-day cruise will be conducted in one Leg.

NOAA Ship *Gordon Gunter* will collect acoustic backscatter profiles on the oil plume using the EK-60. It is anticipated that characteristic signatures of subsurface plumes can be identified at frequencies <30 kHz. Validation of the acoustic backscatter profiles will be conducted using water samples from Niskin bottles sampling at the depth of the backscatter profiles. A CTD may be deployed to collect water samples, vertical temperature profiles, and other relevant environmental information if damage to the sensors can be determined not to occur in oiled waters. If a CTD cannot be deployed, water samples will be taken with separate Niskin bottles.

Sampling with the EK-60 will be conducted using line transects beginning about 2 km from the oil wellhead and conducted in a 360 degree arc around the well to allow tracking of oil in all directions from the source. Transects will continue until the edges of the plume are identified and should be continued slightly past the edge of the plume to provide a picture of unperturbed vs. perturbed environments. If plumes of higher oil concentrations are observed, sampling will be conducted to attempt to follow these plumes beyond the search area, if necessary. At a minimum, five transects will be conducted and Niskin water bottle and/or CTD samples will be taken every 15 miles on each transect. MOCNESS tows will be conducted immediately beyond the margin of the plume as a proxy for likely biota within the adjacent waters within the plume area. Real time analysis for presence/absence of oil will be conducted

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using instrumentation TBD. Results will be used to ground truth shipboard interpretations of EK-60 backscatter.

Upon completion of the characterization of subsurface oil plumes, adaptive sampling for bluefin tuna larvae will be conducted within the loop current, and, in particular, in areas identified as having surface or subsurface oil. Satellite imagery and acoustic backscatter profiles will be used to identify ichthyoplankton stations based upon a current larval bluefin habitat model. These stations will be sent to the ship along with the satellite imagery each day. Each station will consist of a CTD to 500 meters, a 10 minute subsurface neuston tow using the 505 mesh net, and a standard 10 minute neuston tow. The subsurface nesuton net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. This pattern will be repeated for 10 minutes. Flow meter reading will be recorded for the tow. At selected stations the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. All samples will be preserved in 95% ethanol in accordance with standard SEAMAP protocols

Communication between the ichthyoplankton team and the bridge on station will be accomplished via hand held radios. During rough weather, the watch leader with consultation from the ship's crew will determine if all sampling gear can be deployed safely. The Field Party Chief should be notified of any delays to sampling due to mechanical, medical or weather issues as well. The Chief Engineer should also be made aware of expected time of arrival at the first station so the salt water pumps can be turned on and ready for net washdown.

SEAMAP CTD Profiles

The CTD unit with the SBE 32 water carousel with three Niskin bottles will be deployed to just below the surface of the water when all areas are ready. When at the surface, the lab scientist will start the CTD recording. The sampler must then remain submerged for 3 minutes at the surface for the temperature gauge to adjust to the water temperature after sitting on deck between stations. After the 3 minute soak period the CTD will be lowered to the depth of the acoustic backscatter profile. After the cast, the CTD is carefully set on deck, taking care not to jar the sensitive electronics. We request the Electronics Technician periodically clear the y-connections throughout the cruise. The CTD must be cleaned of any oily residue following each station and sensors should be examined for any damage due to oil immersion.

Niskin Bottles

If a CTD cannot be used due to damage to the sensors from oil immersion, water samples will be collected using separate Niskin bottles. The Niskin bottles will be lowered to the depth of the acoustic backscatter profile and samples collected at depths determined by the profile. A subset of the samples will be preserved according to NRDA chain of custody protocols chemical analysis. Real time analysis for presence/absence of oil will be conducted using instrumentation TBD.

Neuston Sampling

The neuston net is a 1 x 2 m frame outfitted with a 505 mm mesh net. Each neuston tow will be conducted for 10 minutes. The neuston net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. If necessary, the ship should steam forward

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in a wide arc to keep the neuston net (mouth opening) out of the influence of the prop wash. The duration of a neuston tow may be shortened up to five minutes when there are high concentrations of jellyfish, ctenophores, Sargassum, floating weed and/or debris. After retrieval, plankton is rinsed into cod end with seawater while net hangs over side (if windy, watch leader may request net to be brought directly on board and rinsed on deck). Samples will be preserved in 95% ETOH initially and transferred to new 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols chemical analysis.

1 m MOCNESS Sampling

The Southeast Fisheries Science Center (SEFSC) will provide the 1 m MOCNESS and associated electronic equipment to record the environmental data. The MOCNESS will be deployed from the stern with the MOCNESS winch at the same location as the CTD or Niskin bottle collections. Prior to deployment, the ship speed should be maintained at 2 kt. However, once the MOCNESS is lowered into the water, the props should be disengaged to avoid damage by the ship's prop wash. The props can be reengaged once the watch leader has relayed to the bridge that the nets are at a safe depth. Once deployed, a series of 9 nets (0.505 mm mesh) can be opened independently at specific depths to obtain a discrete sample of that depth. For the oil plume characterization survey, depths will be determined based on the acoustic backscatter profile obtained by the EK-60. For the bluefin tuna larval survey, the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. The depth may be modified depending on the acoustic backscatter profile at the sampling station. Winch and ship speed will be manipulated by the watch leader through communication with the deck and bridge in order to filter a target volume of 250 m^3 for each net. The watch leader will let the bridge know when to disengage the props as the nets reach the surface during retrieval. After retrieval, samples will be rinsed into cod ends with seawater before bringing the MOCNESS on deck. Each oblique sample (surface to maximum depth) will be initially preserved in 10% formalin and transferred to 95% ETOH after 36 hours. The remaining nets will be initially preserved in 95% ETOH and transferred to fresh 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols chemical analysis.

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III. Equipment

A. Equipment and Capabilities Provided by the Ship:

1. Because of the importance of the CTD equipment package to record environmental data and the need for the Scientific Computing System (SCS) to populate the Fishery Scientific Computing System (FSCS), an Electronics Technician is imperative.
2. Hydrographic winch with wire and meter readout to accomplish CTD/bottle cast. Spare slip rings for each winch. Fully functional wire readouts for each winch.
3. ADCP
4. One (1) Primary SBE 9plus CTD configured as follows;
 a. Unit should be mounted horizontally and mounted in the water sampling frame. The frame should be examined to ensure it is in good physical condition and there are no breaks present in any of the welds supporting the frame.
 b. The standard 12 position SBE 32 Carousel should be properly mounted in the water sampler section of the frame and tested to ensure that all 12 bottle positions are working properly and respond to software requests for firing.
 c. The internal Digiquartz pressure sensor should be in good working order and have a calibration/service date not to exceed 365 days.
 d. The primary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 i. One (1) SBE 3 Premium Temperature sensor
 ii. One (1) SBE 4 Conductivity sensor
 iii. One (1) SBE 43 Dissolved Oxygen sensor
 iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
 v. One (1) Wetlabs Wetstar pumped fluorometer
 vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
 vii. One (1) Wetlabs C-Star transmissometer
 viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.
 e. The secondary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 i. One (1) SBE 3 Premium Temperature sensor
 ii. One (1) SBE 4 Conductivity sensor
 iii. One (1) SBE 43 Dissolved Oxygen sensor
 iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
 v. One (1) Wetlabs Wetstar pumped fluorometer
 vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.

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vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

f. The unit should be properly terminated and connected to a properly functioning SBE 11 Deck Unit. The deck unit should be connected to allow the following:
i. Proper control of the SBE Water Sampler Carousel via the SEASAVE application.
ii. Integration of a proper NMEA signal from a GPS unit.

7. A second SBE 9plus profiler should be available as well. Unit does not have to be configured as a complete functioning ready-to-install on the sea cable unit; however, it should have the following components available:
a. Sensors for a Primary suite (with a calibration date as recent as possible, not to exceed 365 days):
i. One (1) SBE 3 Premium Temperature sensor
ii. One (1) SBE 4 Conductivity sensor
iii. One (1) SBE 43 Dissolved Oxygen sensor
iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
v. One (1) Wetlabs Wetstar pumped fluorometer
vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

b. Sensors for a complete Secondary suite (with a calibration date as recent as possible, not to exceed 365 days):
i. One (1) SBE 3 Premium Temperature sensor
ii. One (1) SBE 4 Conductivity sensor
iii. One (1) SBE 43 Dissolved Oxygen sensor
iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
v. One (1) Wetlabs Wetstar pumped fluorometer
vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
vii. One (1) Wetlabs C-Star transmissometer
viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.

8. A second SBE 11 Deck Unit should be on the ship to be put into service if needed.
9. It is highly desirable to have the following additional spare sensors on-board if possible:
a. One (1) SBE 43 DO Sensor

b. One (1) SBE 3 Temperature Sensor
c. One (1) SBE 4 Conductivity Sensor
d. One (1) Wetlabs Wetstar pumped fluorometer
e. One (1) Wetlabs C-Star Transmissometer
f. One (1) SBE 5T Pump

15. Copies of all calibration sheets for CTD profilers, TSG, and spare sensors should be provided to the laboratories' Shipboard System Specialist prior to sailing.
16. CTD capable winch and J-frame for CTD casts, with sufficient electromechanical cable for casts to 500 m.
17. NMEA GPS input to CTD header file.

<u>The following data are requested of the SCS</u>

The SCS system should be fully operational for the duration of the survey. A listing of any sensors that will not be functional for the survey should be provided prior to sailing to the Field Party Chief, taking into consideration that event templates will have to be checked by the Shipboard System Specialists to ensure there will be no impact or an alternative sensor can be selected.

1. NorthStar 952X
 a. UTC time
 b. Latitude
 c. Longitude
 d. Speed over ground
 e. Course over ground
2. Furuno GP-90 GPS
 a. Latitude
 b. Longitude
 c. Speed over ground
 d. Course over ground
3. Sperry speed log
 a. Speed through the water
 b. Speed over ground
4. EQ50 and EK60 depth in meters
5. Gyro-heading
6. Air temperature (°C)
7. Corrected barometric pressure
8. True wind speed
9. True wind direction
10. SIMRAD ITI Trawl System (Temperature and Depth only)
11. Information should be passed to the Rotating ET to ensure the following:
 a. The Automatic Logger Control on the SCS Server must be enabled anytime ACQ is started and should use the default of 0:00:00 (Midnight GMT).
 b. The contents of the Eventdata folder should be allowed to remain present for the duration of the survey (they should not be deleted between legs). This will ensure that event IDs do not restart for the respective events

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during the survey.

SEASAVE SOFTWARE

Prior to sailing, the proper .CON files should be built in SEASAVE. The software should be set to look for the proper .CON file for the respective instrument.

It is also highly desirable that the ASCII Out function be allowed to feed CTD data into SCS via serial cable.

B. Equipment and Capabilities Provided by the Scientists:

Mississippi Laboratory

1. Flowmeters (6)
2. 1 m MOCNESS frame, (9) 0.505 mm nets, and electronic equipment
3. Conducting wire (5/8-in) and corresponding block for MOCNESS tows
4. Plankton sampling supplies box
5. Plankton preserving jars, lids and labels
6. Turner Designs 10-AU benchtop Fluorometer
7. Chemical transfer pumps
8. Formalin and ethyl alcohol
9. Triton (R) X-100
10. Methanol and filters
11. 6 Niskin bottles
12. 4 Garden hoses for washing down nets, nozzles, and hose repair parts
13. Plankton transfer table
14. 5 gallon buckets
15. Various clerical supplies
16. SIMRAD ITI Temperature/Depth Sensor
17. Spare batteries for the SBE 19 Seacat profilers

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Sub-Surface Oil Monitoring Cruise

Commanding Officer
NOAA Ship *Gordon Gunter*

CRUISE PLAN
NOAA Ship *Gordon Gunter* Cruise GU-10-02

I. Overview

A. Cruise Period: May 27, 2010 – June 4, 2010

B. Operating Area: Gulf of Mexico – Boundaries of the oil wellhead

C. Summary of Objectives:

1. ***Primary Objectives***

a. Validate the use of acoustics using EK-60 to detect sub-surface oil plumes.
 i. Characterize the vertical and horizontal distribution of subsurface oil plume near the oil wellhead.
 ii. Identify oil particle size distribution and changes in oil characteristics as the plume is transported.
b. Collect water samples in likely "target" areas to confirm the acoustic backscatter profile from the EK-60 are oil patches.
c. Collect temperature, dissolved oxygen, fluoromity profiles in the vicinity of the plume
d. Assess the occurrence, abundance and distribution of the early life stages of spawning fish in the boundary areas around the oil plume.

2. ***Secondary Objectives***

a. Assess bluefin tuna larval abundance and distribution within the loop current, in relation to the oil plume.

D. Participating Institutions:

National Marine Fisheries Service
- Pascagoula Laboratory
- Miami Laboratory
- Stennis Laboratory
- Woods Hole Laboratory

Monterey Bay Aquarium Research Institute
University of New Hampshire
Woods Hole Oceanographic Institution
University of South Florida
United States Coast Guard

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E. Personnel (Science Party)

Name	Title	Sex	Organization	Citizenship	
LEG 1 (May 25 – June 8, 2010)					
Russell Brown	FPC	M	NOAA, NEFSC	USA	
Tom Weber	EK60 Biologist	M	Univ. New Hampshire		USA
Sam Greenaway	EK60 Biologist	M	NOAA , OMAO	USA	
Charles Thompson	EK60 Biologist	M	NOAA , MS	USA	
Hans Thomas	AUV Group Leader	M	MBARI	USA	
Yanwu Zhang	AUV Research Specialist	M	MBARI	USA	
Erich Rienecker	AUV Technician	M	MBARI	USA	
Glenn Zapfe	Plankton Biologist	M	NOAA , SEFSC	USA	
Aki Shiroza	Plankton Biologist	M	NOAA , SEFSC	USA	
Dr. Andrew Remsen	SIPPER Project Leader	M	Univ. South Florida	USA	
Robert Nelson	Water Chemistry Specialist	M	WHOI, Woods Hole	USA	
Shailer Cummings	Water Chemistry Specialist	M	OAR/AOML	USA	
Dan Hahn		M	NOAA/NRDA		USA
Tom Moore		M	NOAA/NRDA		USA
Charles Varela	USGS Strike Team	M	U.S. Coast Guard	USA	
Stephan Fournet		M	ENTRIX	USA	

F. Administrative:

1. Points of Contact:

 Field Party Chief: Russell Brown, NOAA Fisheries, NEFSC
 Russell.brown@noaa.gov
 Operations Officer: LT Kent Stein/ ENS Adrienne Hopper; NOAA Ship *Gordon Gunter*, 151 Watts Ave, Pascagoula, MS 39567; (228)327-7905; OPS.Gordon.Gunter@noaa.gov

2. Diplomatic Clearances: No diplomatic clearances are required.

3. Licenses and Permits:

 This cruise will be conducted under the following permits:
 Florida State Permit, Alabama State Permit, Mississippi State Permit, Louisiana State Permit, Texas State Permit, Southeast NMFS Regional Permit, Sea Turtle Permit, Marine Mammal Permit

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II. Operations

A. Cruise Plan/Itinerary:
Itinerary:

Leg	Date	Location
1	May 27, 2010	Depart Pascagoula, MS
	June 4, 2010	Arrive Pascagoula, MS

B. Staging and Destaging: PASCAGOULA/PASCAGOULA

C. Primary Operational Systems/Capabilities

Acoustics – Simrad EK60 operations:
- Backscatter
- 3-D and 4-D images
- Bathymetry

Expendable BathyThermograph (XBT)
- Temperature Profiles to 800 or 1200 meters (temperature dependent)

Rosette Water Sampling (Teflon Bottles for sampling oiled waters)
- Discrete depth water sampling

MOCNESS Multiple Opening/Closing Net System
- Discrete depth sampling of zooplankton and larval fish

Spanish Neuston Net
- Quantitative sampling of larval fish and zooplankton integrated across shallow depths

MBARI Gulper Autonomous Underwater Vehicle (AUV)
- Operations to 1500 meters with 12 hour endurance
- Up to 10 controlled water samples
- CTD and Fluorometer sensors
- Deepwater transmissionometer

Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER) Towed Body
- High resolution information on the distribution of zooplankton, phytoplankton, larval fish and abiotic material (including oil droplets) to 350 m
- CTD and fluorometer
- Transmissionometer

C. Operations to be conducted:
Operational Plans:

NOAA Ship *Gordon Gunter* will depart Pascagoula, Mississippi on May 27, 2010 to conduct a survey to characterize the vertical and horizontal characteristics of the oil plume. The 8-day cruise will be conducted in one Leg.

Acoustics (EK60 Sampling)
NOAA Ship *Gordon Gunter* will collect acoustic backscatter profiles on the oil plume using the EK-60. It is anticipated that characteristic signatures of subsurface plumes can be identified at frequencies <30 kHz. Validation of the acoustic backscatter profiles will be conducted using water samples from Niskin bottles sampling at the depth of the backscatter profiles. A rosette using Teflon-coated Niskin bottles will be deployed to collect water samples, vertical temperature profiles, and other relevant environmental information. A CTD will not be used due to damage to sensors from immersion in oil.

Sampling with the EK-60 will be conducted using line transects beginning at 5 nm from the oil wellhead and conducted in a 360 degree arc around the well to allow tracking of oil in all directions from the source. **Given that the objective of this sampling is to detect and measure a gradient of oil flow trajectories, the closer proximity to the wellhead (if permissible) would increase the effectiveness and value of our sampling.** We plan to coordinate with Unified Command contacts in real time, noting that the exclusion zone expands or contracts depending on mitigation activities.

Transects will continue until the edges of the plume are identified and should be continued slightly past the edge of the plume to provide a picture of unperturbed vs. perturbed environments. If plumes of higher oil concentrations are observed, sampling will be conducted to attempt to follow these plumes beyond the search area, if necessary. At a minimum, five transects will be conducted and Niskin water bottle and/or CTD samples will be taken every 15 miles on each transect. University of New Hampshire Joint Hydrographic Center scientists will process EK-60 transect data in real-time onboard the Gunter and will produce three-dimensional maps of backscatter density distribution.

MBARI AUV Sampling
In situ water samples will be collected with the MBARI Upper Ocean Autonomous Underwater Vehicle ("Gulper") to assist in calibrating the EK-60. A Sonardyne Ultra Short Baseline (USBL) system will be used to track the AUV and an acoustic modem will be used to communicate with the vehicle. In areas where deeper acoustic patterns are detected, the MBARI AUV will be deployed to undulate above, through and below target depths, while collecting water samplings from above, within and below the target depths. The AUV will be configured to sample to 1500 m depths and has endurance for twelve hour missions.

Water samples will be collected in surface mixed layer (below surface to thermocline), for whole and dissolved polyaromatic hydrocarbons, volatiles, dispersant compounds and products of combustion. oil/sheen samples for fingerprinting and oil droplet size at transects across areas of known or suspected dispersed oil (from aerial application and subsurface injection) and areas of

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controlled burn. Samples will be taken to test for the presence of dispersed oil and droplet size. Water samples will be collected at four depths: just below the surface, mid mixed-layer (between thermocline/pycnocline and surface), just above the thermocline, and just below the thermocline, using a conventional hydrowire with 5 L Go Flow Bottles and a rosette sampling array with pre-programmed sampling depths.

Water samples will be tested for microbial analysis using a vacuum filtration and cryovial preservation techniques. This analysis will allow extraction of DNA to evaluate microbes in plume vs. non-plume waters. Oil fluorescence will be tested using the Cyclops 7 configured in a pH meter mode that can test fluorescence of water samples in wide mouth jars.

XBT Sampling

Expendable BathyThermograph (XBT) will be also deployed to obtain thermal information of the full water column. These probes measure temperature to depths of about 850m (Deep Blue) or 1200m (Fast Deep). These probes will be critical in case the CTD casts cannot be performed due to damage to the sensors after submergence in oil. Temperature observations can be used to identify water masses from their temperature signature. In addition, the structure of the subsurface temperature (isotherm slopes) can be used to determine surface and subsurface currents. Observations from XBTs will provide critical information that will not be obtained with any other platform. Note that satellite observations provide only information on surface dynamics; XBT and CTD data will help identify subsurface thermal and dynamical conditions. While CTD casts are performed, we propose to deploy XBTs in between CTD casts. If CTD casts are not being performed, we propose to deploy XBTs in place of these casts (where Niskin or Go-Flow samples are still being taken). There is no need for additional personnel to add XBT deployments.

In addition, surface drifters will be used to estimate surface currents (direction and speed). Surface drifters are also equipped with sea surface temperature sensors. Their data are transmitted in real-time to NOAA for quality control and immediate distribution to the GTS and data centers. Data from drifters are valuable because they help validate model and satellite estimates of surface currents. Their deployment is simple and only a few minutes of training is required.

SIPPER Sampling

Oil droplets will also be measured using the Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER), a towed, suspended particle imaging system. Results will be used to ground truth shipboard interpretations of EK-60 backscatter. The SIPPER system will also collect high resolution information on the distribution of zooplankton, phytoplankton, larval fish and detritus within a 100 cm^2 sampling area as it moves through the water. The SIPPER will also be used to determine the composition of scattering layers and their vertical extent. The SIPPER will be towed horizontally and vertically to determine the zooplankton and part of the icthyoplankton response to water possibly affected by the spill. The SIPPER towbody is outfitted with a SBE-19 plus CTD, SBE 43 Oxygen sensor, a Wetlabs Chl a and backscatter ECO fluorometer, a Wetlabs Wetstar transmissometer and a Wetlabs ECO CDOM fluorometer. SIPPER can deploy with all the sensors but a decision will need to be made whether to run with the transmissometer or the CDOM fluorometer as the CTD can only handle four external sensor inputs.

MOCNESS Sampling:
Plankton samples will be taken with the Multiple Opening and Closing Environmental Sampling System (MOCNESS) immediately beyond the margin of the plume but will not be conducted in any oiled areas. The MOCNESS tows will provide plankton collections for RNA analyses, and may serve as a proxy for likely biota within the adjacent waters within the plume area.

Upon completion of the characterization of subsurface oil plumes, adaptive sampling for bluefin tuna larvae will be conducted in areas identified as having surface or subsurface oil. Satellite imagery and acoustic backscatter profiles will be used to identify ichthyoplankton stations based upon a current larval bluefin habitat model. These stations will be sent to the ship along with the satellite imagery each day. Each station will consist of a CTD to 500 meters, a 10 minute subsurface neuston tow using the 505 mesh net, and a standard 10 minute neuston tow. The subsurface nesuton net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. This pattern will be repeated for 10 minutes. Flow meter reading will be recorded for the tow. At selected stations the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. All samples will be preserved in 95% ethanol in accordance with standard SEAMAP protocols

Communication between the deck sampling teams and the bridge on station will be accomplished via hand held radios. During rough weather, the watch leader with consultation from the ship's crew will determine if all sampling gear can be deployed safely. The Field Party Chief should be notified of any delays to sampling due to mechanical, medical or weather issues as well. The Chief Engineer should also be made aware of expected time of arrival at the first station so the salt water pumps can be turned on and ready for net washdown.

D. Sampling Methods

XBT Deployments
NOAA/AOML currently will provide 200 Deep Blues and 12 Fast Deeps to be used for the mapping of the subsurface temperature field. The advantage of these probes is that they can be deployed with the ship stationary or moving (up to 20 knots). Temperature profiles will be transmitted in real-time via email to AOML and inserted into the GTS for immediate analysis and to assimilate into numerical models.

Surface Drifters
Surface drifters are best deployed underway (at speeds above 2 knots). AOML plans to send six surface drifters for deployment on this cruise. The location of deployment will be in regions where the characterization of surface dynamics show potential for a larger spreading of the oil. Observations obtained from these drifters will be critical to validate numerical model output and satellite estimates of surface currents.

Niskin Bottles
Water samples will be collected using a rosette with 6-12 Teflon-coated Niskin bottles. The Niskin bottles will be lowered to the depth of the acoustic backscatter profile and samples collected at depths determined by the profile. A subset of the samples will be preserved

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according to NRDA chain of custody protocols for chemical analysis. A subsample of water samples will be placed in a wide mouth jar and tested for real time analysis for presence/absence of oil using the Cyclops 7 configured as a pH meter.

MOCNESS Sampling

The Southeast Fisheries Science Center (SEFSC) will provide the 1 m MOCNESS and associated electronic equipment to record the environmental data. The MOCNESS will be deployed from the stern with the MOCNESS winch at the same location as the Niskin bottle collections. Prior to deployment, the ship speed should be maintained at 2 kt. However, once the MOCNESS is lowered into the water, the props should be disengaged to avoid damage by the ship's prop wash. The props can be reengaged once the watch leader has relayed to the bridge that the nets are at a safe depth. Once deployed, a series of 9 nets (0.505 mm mesh) can be opened independently at specific depths to obtain a discrete sample of that depth. For the oil plume characterization survey, depths will be determined based on the acoustic backscatter profile obtained by the EK-60. For the bluefin tuna larval survey, the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. The depth may be modified depending on the acoustic backscatter profile at the sampling station. Winch and ship speed will be manipulated by the watch leader through communication with the deck and bridge in order to filter a target volume of 250 m^3 for each net. The watch leader will let the bridge know when to disengage the props as the nets reach the surface during retrieval. After retrieval, samples will be rinsed into cod ends with seawater before bringing the MOCNESS on deck. Each oblique sample (surface to maximum depth) will be initially preserved in 10% formalin and transferred to 95% ETOH after 36 hours. The remaining nets will be initially preserved in 95% ETOH and transferred to fresh 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols chemical analysis.

MBARI Upper Ocean Autonomous Underwater Vehicle ("Gulper")

The "Gulper" will be deployed using the crane on the Gunter off the port side of the vessel. The "Gulper" will be programmed for collecting water samples at discrete depths. Communication and tracking of the "Gulper" will be as follows:

The frequencies used for the Sonardyne USBLE and Benthos Acoustic Modems are Sonardyne WSM USBL Beacon HPR Channel H01 (also B01) with a reply frequency for H01 of 29.762kHz. This frequency can be easily changed if that particular channel is being used. The beacon receives the pulse from the ship transceiver at 20.492 kHz. The Benthos ATM-885 Modem is in the 9-14 kHz (2-6 km) range.

Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER)

The SIPPER will be towed horizontally and vertically to determine the zooplankton and part of the icthyoplankton response to water possibly affected by the spill. The SIPPER will be deployed on the Gunter's CTD cable to its maximum depth of 350 m in search of subsurface oil and possibly detect it visually, through its DO meter, CDOM sensor or transmissometer/backscatter sensors.. The SIPPER will be deployed off the Gunter with standard 0.322" conducting (3 conductor) cable and a slip ring. The system will be towed through the water at speeds between 1-4 knots and willn sample down to depths of 350 m. SIPPER tows require at least an hour per

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100 m depth. The SIPPER system will conduct multiple tows in both impact and pre-impact waters at least 6 hours per/day. Exact station locations will be adaptively selected.

Cyclops 7

The Turner Design Cyclops 7 will be configured as a pH meter and will be used on the deck to analyze water samples for oil fluorescence. A subset of water samples from Niskin bottles and the "Gulper" will be placed in wide mouth jars. The Cyclops 7 probe will be inserted into the jar to obtain a fluorescence reading.

Microbial Analysis

100-250 mil of water samples will be filtered through 0.22um pore size 25mm or 47mm diameter filters by standard vacuum filtration. The filter will be rolled into a labeled cryovial and frozen. DNA will be extracted from these filters to identify microbes present in plume and non-plume waters.

Neuston Sampling for Bluefin Tuna Larvae

The neuston net is a 1 x 2 m frame outfitted with a 505 mm mesh net. Each neuston tow will be conducted for 10 minutes. The neuston net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. If necessary, the ship should steam forward in a wide arc to keep the neuston net (mouth opening) out of the influence of the prop wash. The duration of a neuston tow may be shortened up to five minutes when there are high concentrations of jellyfish, ctenophores, Sargassum, floating weed and/or debris. After retrieval, plankton is rinsed into cod end with seawater while net hangs over side (if windy, watch leader may request net to be brought directly on board and rinsed on deck). Samples will be preserved in 95% ETOH initially and transferred to new 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols for chemical analysis.

III. Equipment

A. Equipment and Capabilities Provided by the Ship:

1. Electronics Technician to provide support for the Scientific Computing System (SCS) to populate the Fishery Scientific Computing System (FSCS), an Electronics Technician is imperative.

2. Hydrographic winch with wire and meter readout to accomplish Niskin bottle cast. Spare slip rings for each winch. Fully functional wire readouts for each winch.
3. ADCP
4. Refrigeration for approximately 400 1 liter amber glass jars for 400 40 ml for volatiles (or about 100 at a time).
5. Storage for 8 coolers and freezer space for blue ice for maintaining sample temperature while in transit.
6. The SIPPER was developed for operation on most oceanographic vessels that carry standard 3 conductor 0.322" hydro-wire used for CTD and trawl operations. It utilizes two conductors to operate a digital subscriber line (DSL) connection between the SIPPER and a personal computer on board the ship. We've operated on cable lengths up to 10 km long. Typically this hydro-wire is terminated with female Impulse RMG-

2-FS connector or a female Impulse IE2F-5/8 connector. We have the capability to connect to either. If the cable is terminated differently, we can either re-terminate the cable or build an adapter pigtail with the correct connectors. A winch with a payout speed and wire out indicator is preferred but not necessary.

7. The ship would need an A-frame that can lift a 250 lb tow-body and a block that could handle a 400 lb. dynamic load and clearance to lift a 3' wide, 5' long and 2' high tow-body. A working deck area at least 10’ wide and long would be necessary for safely deploying and recovering the system.
8. The SIPPER is operated remotely through DSL link to a desktop computer on the ship. We would need space for an operator and computer as well as 120V AC to power the computer, DSL modem and other accessories. This space should be in proximity to the slip-ring conductors or a remote junction box. Additionally, as SIPPER is powered via battery, we would require a 3’ by 2’ area for a battery charging station and another 120V AC outlet.
9. One (1) Primary SBE 9plus CTD configured as follows;
 a. Unit should be mounted horizontally and mounted in the water sampling frame. The frame should be examined to ensure it is in good physical condition and there are no breaks present in any of the welds supporting the frame.
 b. The standard 12 position SBE 32 Carousel should be properly mounted in the water sampler section of the frame and tested to ensure that all 12 bottle positions are working properly and respond to software requests for firing.
 c. The internal Digiquartz pressure sensor should be in good working order and have a calibration/service date not to exceed 365 days.
 d. The primary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 i. One (1) SBE 3 Premium Temperature sensor
 ii. One (1) SBE 4 Conductivity sensor
 iii. One (1) SBE 43 Dissolved Oxygen sensor
 iv. One (1) “Y” air bleeder valve. Valve should be checked to ensure it is not clogged.
 v. One (1) Wetlabs Wetstar pumped fluorometer
 vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
 vii. One (1) Wetlabs C-Star transmissometer
 viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird’s recommended method of plumbing and is free from cracks and holes.
 f. The unit should be properly terminated and connected to a properly functioning SBE 11 Deck Unit. The deck unit should be connected to allow the following:
 i. Proper control of the SBE Water Sampler Carousel via the SEASAVE application.
 ii. Integration of a proper NMEA signal from a GPS unit.

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10. SIPPER Requirements: Lab space near the junction box for the winch slip ring conductors will be required to operate a personal computer and the DSL modem to connect with the ship cable conductors. Additional space on the ship for a processing computer (desktop) and battery charging station (in a seabox approximately 4’ by 2’ by 2’ would be appreciated nearby as well as space for the following items somewhere in the ship. All these items probably take up a space 8’ long, 3’ wide and 3’ high at most.

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Scientific Computing System (SCS) Requirements:
The SCS system should be fully operational for the duration of the survey. A listing of any sensors that will not be functional for the survey should be provided prior to sailing to the Field Party Chief, taking into consideration that event templates will have to be checked by the Shipboard System Specialists to ensure there will be no impact or an alternative sensor can be selected.

- NorthStar 952X
 - UTC time
 - Latitude
 - Longitude
 - Speed over ground
 - Course over ground
- Furuno GP-90 GPS
 - Latitude
 - Longitude
 - Speed over ground
 - Course over ground
- Sperry speed log
 - Speed through the water
 - Speed over ground
- EQ50 and EK60 depth in meters
- Gyro-heading
- Air temperature (°C)
- Corrected barometric pressure
- True wind speed
- True wind direction
- SIMRAD ITI Trawl System (Temperature and Depth only)
- Information should be passed to the Rotating ET to ensure the following:
 - The Automatic Logger Control on the SCS Server must be enabled anytime ACQ is started and should use the default of 0:00:00 (Midnight GMT).
 - The contents of the Eventdata folder should be allowed to remain present for the duration of the survey (they should not be deleted between legs). This will ensure that event IDs do not restart for the respective events during the survey.

SEASAVE SOFTWARE
Prior to sailing, the proper .CON files should be built in SEASAVE. The software should be set to look for the proper .CON file for the respective instrument.

It is also highly desirable that the ASCII Out function be allowed to feed CTD data into SCS via serial cable.

B. Equipment and Capabilities Provided by the Scientists:

NOAA Fisheries - Mississippi Laboratory

1. Flowmeters (6)
2. 1 m MOCNESS frame, (9) 0.505 mm nets, and electronic equipment
3. Conducting wire (5/8-in) and corresponding block for MOCNESS tows
4. Plankton sampling supplies box
5. Plankton preserving jars, lids and labels
6. Turner Designs 10-AU benchtop Fluorometer
7. Chemical transfer pumps
8. Formalin and ethyl alcohol
9. Triton (R) X-100
10. Methanol and filters
11. 6 Niskin bottles
12. 4 Garden hoses for washing down nets, nozzles, and hose repair parts
13. Plankton transfer table
14. 5 gallon buckets
15. Various clerical supplies
16. SIMRAD ITI Temperature/Depth Sensor
17. Spare batteries for the SBE 19 Seacat profilers
18. Supplies/equipment for RNA analysis (Joanne to coordinate)

Monterey Bay Aquarium Research Institute AUV (Gulper Sampler)

1. 2 SBE25 boardsets
2. 2 SBE3 temperature sensors
3. 2 SBE4 conductivity sensors
4. Paroscientific pressure sensor (UCB4000)
5. SBE43 dissolved oxygen sensor
6. HobiLabs hydroscat 2 (fluorometer)
7. WetLabs ECO-CDOM Puck fluorometer
8. 10 – 1.8 liter water samplers

NOAA/AOML

1. 200 Deep Blue (800m) XBTs
2. 12 Fast Deep (1200m) XBTs
3. 6 Surface Drifters

University of South Florida (SIPPER Sampler)

1. Computer carrying seabox
2. Toolbox
3. Spare cables box
4. Spare hardware box
5. Small box containing spare alkaline batteries
6. 2 boat poles for recovery
7. Small pelican case with additional fluorometers
8. 5 gallon bucket with trim weights

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9. Wooden Pallet for resting SIPPER on deck

Received(Date): Sun, 30 May 2010 12:43:03 -0400
From: "Hogarth, Bill" <billhogarth@usf.edu>
Subject: FW: 05/28 PPT brief
To: 'Roy Crabtree' <Roy.Crabtree@noaa.gov>,'Steve Murawski' <Steve.Murawski@noaa.gov>,'"Nancy.Thompson@noaa.gov"' <Nancy.Thompson@noaa.gov>
RHW-USF5-30-10.pdf

Just in case

Bill Hogarth
Dean, College of Marine Science
University of South Florida
140 Seventh Avenue South, KRC3109
St. Petersburg, FL 33701
Phone: 727-553-3542
Fax: 727-553-3968
email: billhogarth@usf.edu

-----Original Message-----
From: Bob Weisberg [mailto:weisberg@marine.usf.edu]
Sent: Sunday, May 30, 2010 12:26 PM
To: Sole, Michael; McRae, Gil
Cc: Bill.Young@mail.house.gov; Faith.Grant@mail.house.gov; Ellen.Gedalius@mail.house.gov; Karen.Wayland@mail.house.gov; Heather.Havens@mail.house.gov; Solomon, Jenny (Bill Nelson); Anderson, Shahra (Bill Nelson); Glen.Watabayashi@noaa.gov; Chris.Barker@noaa.gov; David.Palandro@myfwc.com; PFOLGER@crs.loc.gov; Henry.norris@myfwc.com; Tymin.Rice@dep.state.fl.us; Domenic.Letobarone@dep.state.fl.us; Timothy.M.Close@uscg.mil; Timothy.l.haws@uscg.mil; Sean.reilly@uscg.mil; Kevin.L.Miller2@uscg.mil; Dan_kimball@nps.gov; Charles.Kovach@dep.state.fl.us; Debra Hernandez; Eric Chassignet; Bill Hogarth; Hine, Albert; skochick@madeirabeachfl.gov; Brian.Lamarre@noaa.gov; Genshaft, President Judy; Wilcox, Ralph; frank.brogan@flbog.edu; Williams, Stephanie (Provost Office); Chachere, Vickie; Hu, Chuanmin; Zheng, Lian Yuan
Subject: Re: 05/28 PPT brief

All,
Attached is my group's latest briefing. I remain concerned about the potential for LC eddy reattachment and certainly for the evolution of subsurface oil.
Bob Weisberg

On 5/28/2010 3:07 PM, Yonggang Liu wrote:
> All,
>
> As requested by Prof. Weisberg, I am sending this PowerPoint brief on
> his behalf.
>
> Over the past week the Loop Current (LC) underwent a process of eddy
> shedding, altering the pathway of the flow of oil. While a small
> amount of oil may have gotten into the Florida Straits by today, other
> oil entrained in the LC may now circulate around the eddy, versus
> taking a more direct path toward the Florida Straits.
>
> The main body of the oil remains near the well site. Based on the 5/27
> re-initialization of oil location it does not appear that surface oil
> will reach any Florida shorelines over the next several days.
>
> For the near-term, the evolution of the LC (whether or not the eddy
> reattaches) and the location of subsurface oil are two major concerns.

>
>
> Best regards,
> Yonggang Liu
>

Oil Spill Tracking in the Eastern Gulf of Mexico

Robert H. Weisberg
Distinguished University Professor
Professor of Physical Oceanography
with
Drs. Y. Liu and L. Zheng, Prof. C. Hu, & the CMS-OCG
College of Marine Science
University of South Florida
and assistance from the HYCOM consortium

May 30, 2010

DISCLAIMER: The nowcast/forecast system and other analyses/data are research products under development. No warranty is made, expressed or implied, regarding accuracy, or regarding the suitability for any particular application. All rights reserved.

Oil Spill Tracking in the Eastern Gulf of Mexico

Initialization on 5/30
Predictions through 6/1

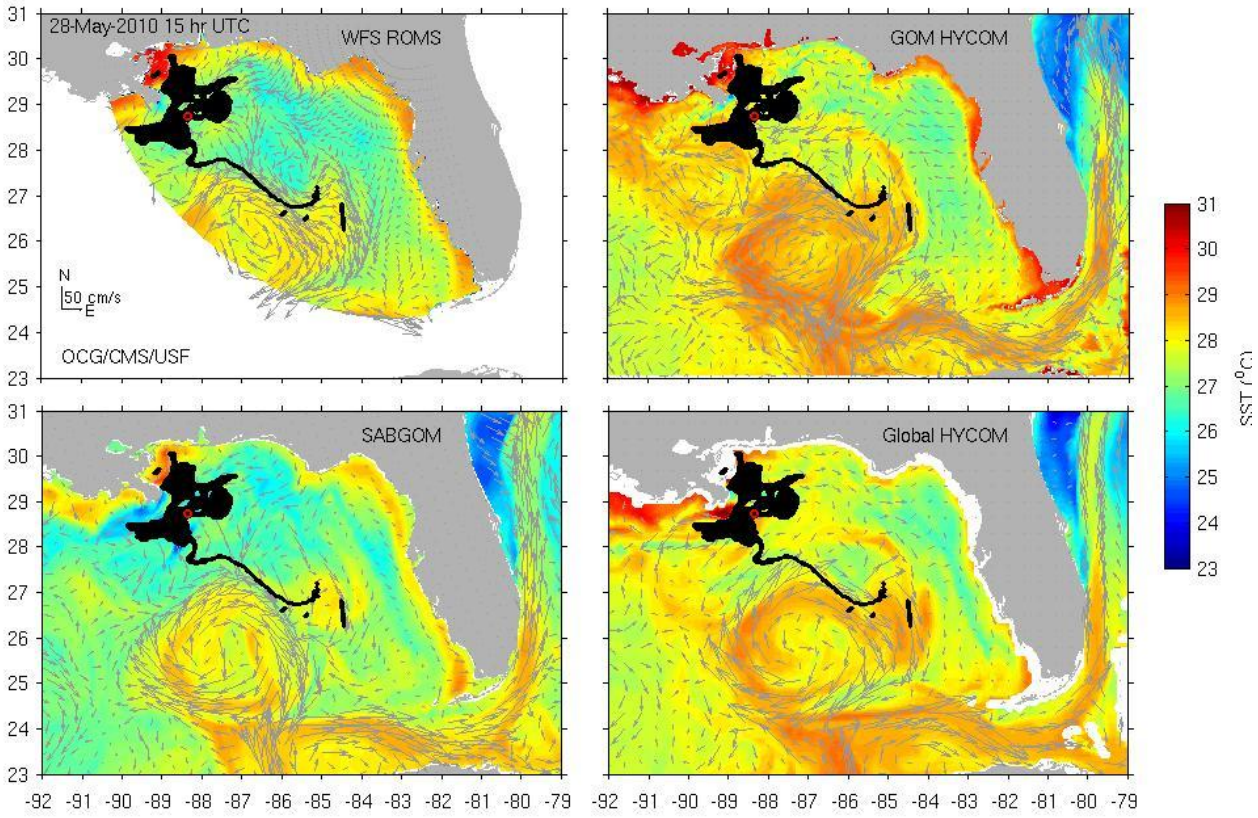
We are applying five different models for tracking oil spilled from the Macondo Well: (1) USF ROMS nested in Global HYCOM, (2) Global HYCOM, (3) Navy GOM HYCOM, (4) NCSU SABGOM, and (5) NOAA RTOFS. For each, we initialize the oil patch using satellite imagery, and simulate the movement of surface particles carried by the model's velocity fields. Simulations include periods of both hindcast and forecasts (using NOAA forecast winds). Results are shown at common times. We also include comparisons of predictions with observations when satellite imagery is available.

Along with the surface trajectory forecasts we are also providing subsurface trajectories for virtual particles continually released at nine different depths and tracked three-dimensionally.

The latest trajectory forecasts from all the models can be interactively viewed at

http://ocgweb.marine.usf.edu/

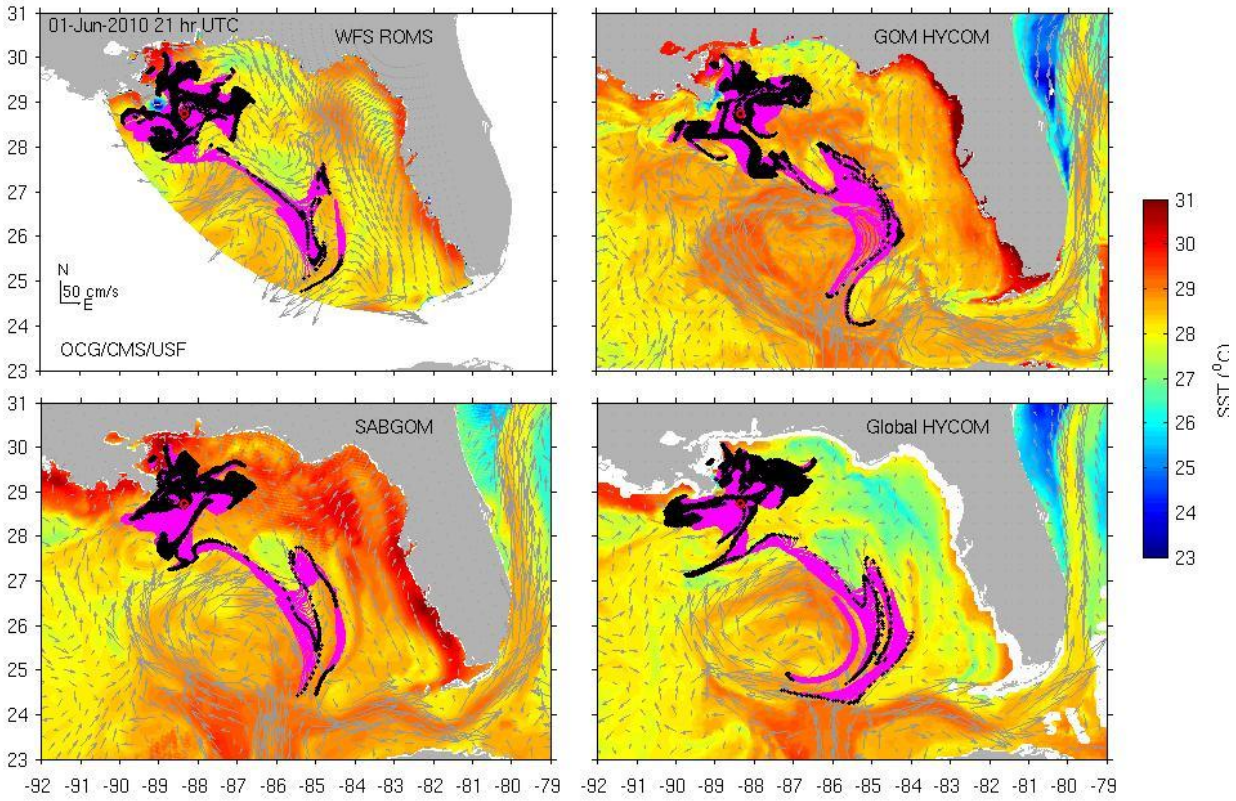
Ensemble Forecast from Four models



Trajectories are estimated using 3-hourly model results starting from a 05/28 oil location initialization by sat. imagery, plus a continual release of new virtual particles from the well site.

http://ocgweb.marine.usf.edu

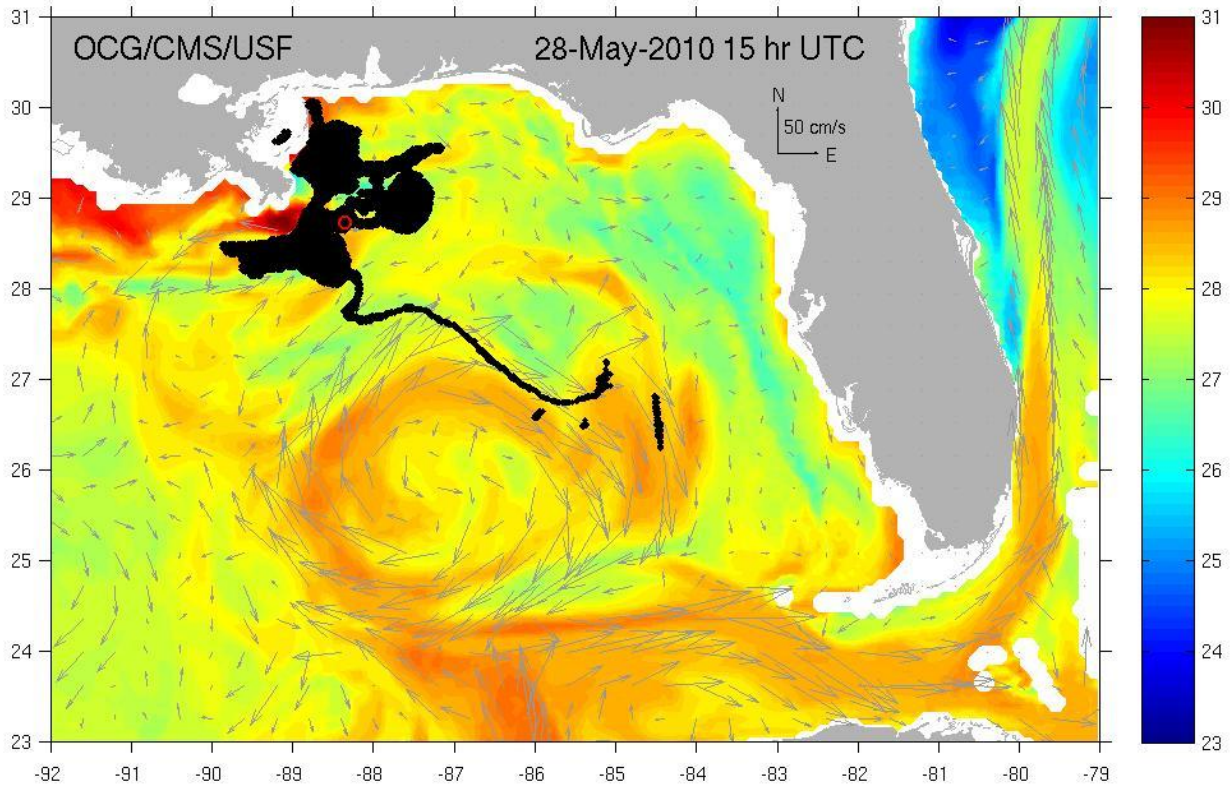
Ensemble Forecast from Four models



<u>Hindcast/forecast for 6/1</u> using 3-hourly trajectory model results starting from a 05/28 oil location initialization by sat. imagery.

http://ocgweb.marine.usf.edu

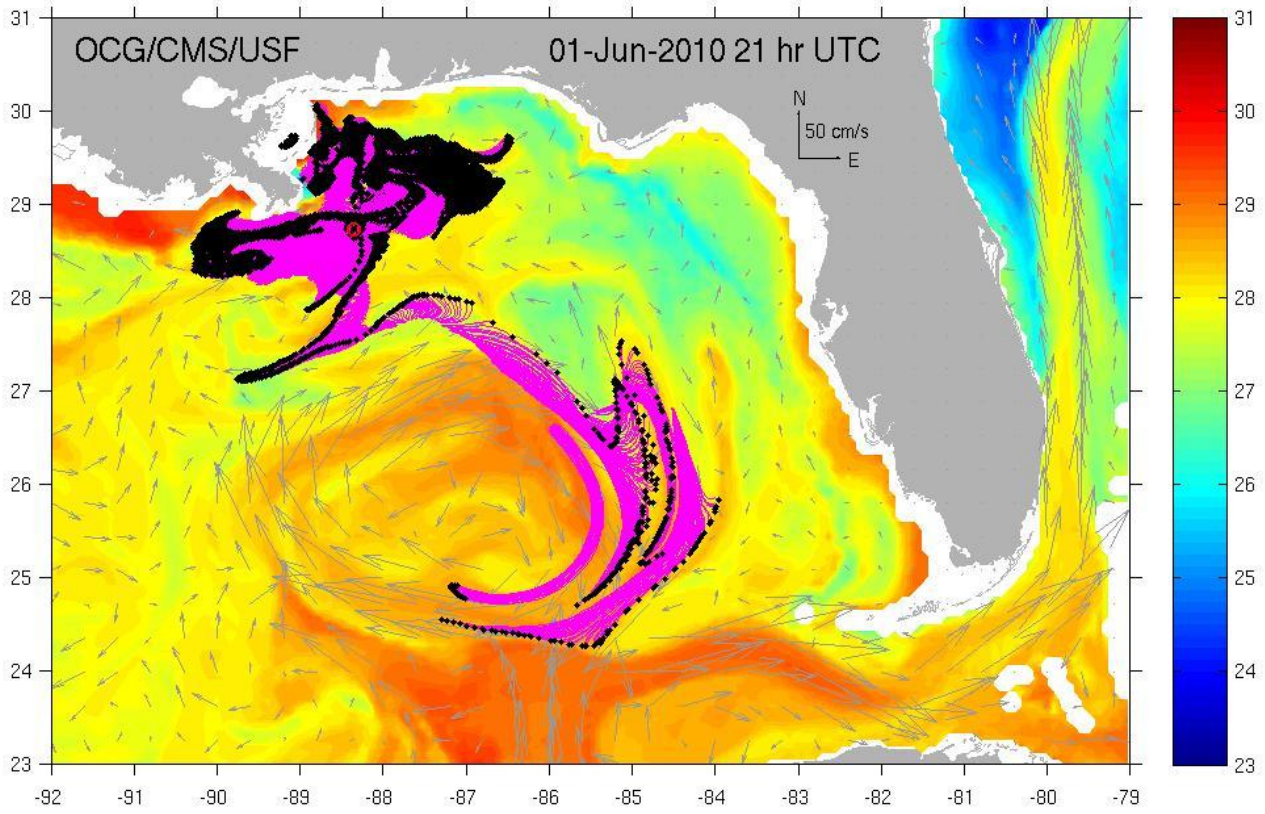
Global HYCOM Nowcast/Forecast



Amongst the present ensemble of models the The Global HYCOM shows the most realistic LC and hence we focus in on this one.

http://ocgweb.marine.usf.edu

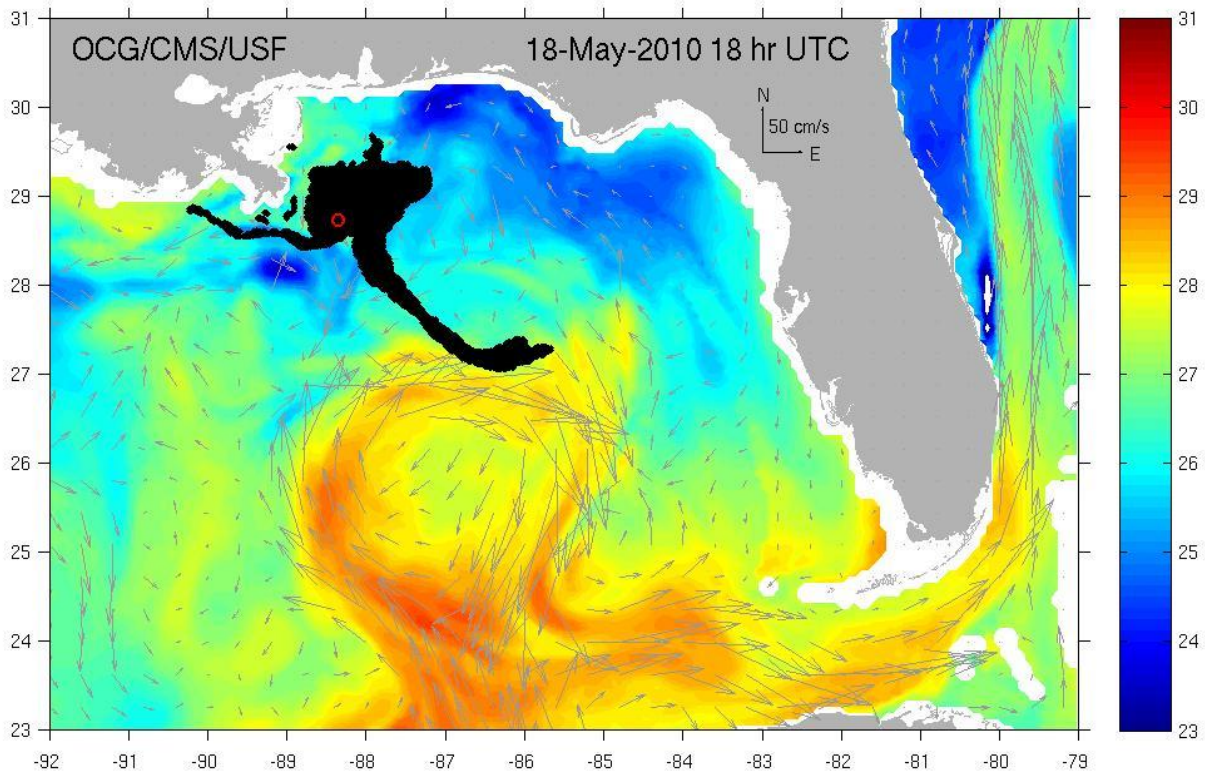
Global HYCOM Nowcast/Forecast



<u>Hindcast/forecast for 6/1</u> using 3-hourly Global HYCOM results starting from a 05/28 sat. imagery oil location initialization.

http://ocgweb.marine.usf.edu

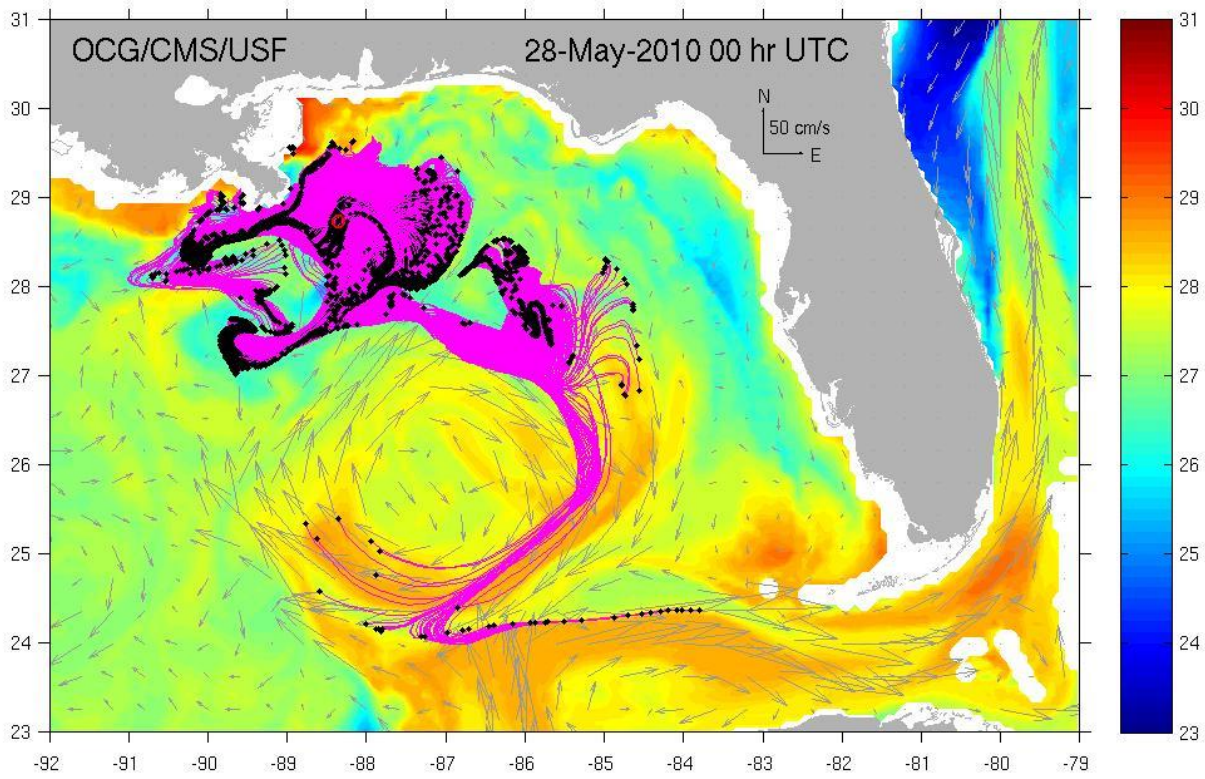
Diagnosis of Global HYCOM H/F



Recognizing that now all oil can be seen in the satellite images we also perform analyses from previous initializations starting from a 05/18 oil location initialization when we knew that oil was entrained in the LC.

http://ocgweb.marine.usf.edu

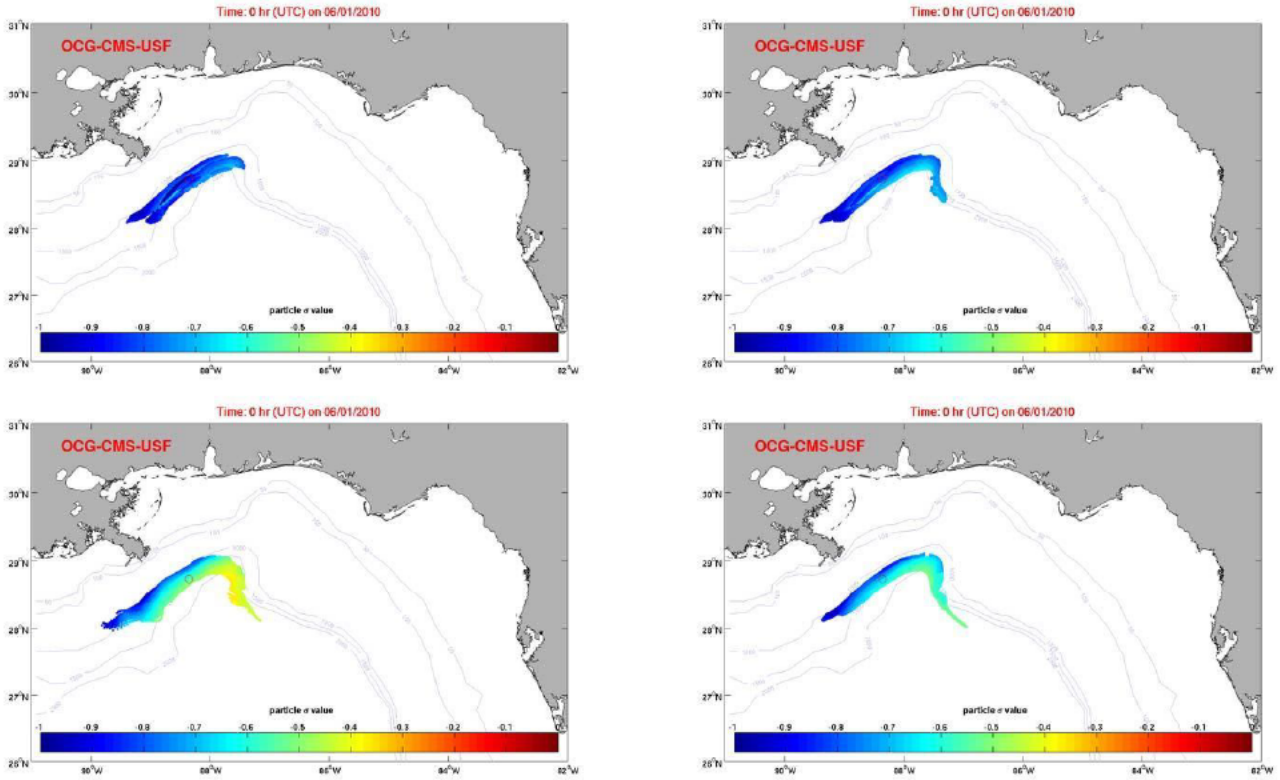
Diagnosis of Global HYCOM H/F



The hindcast/forecast from 5/18 to 5/28 shows some virtual drifters circling a Loop Current eddy and some oil getting into the Florida Straits. LC eddy detachment insulates the Florida Straits from oil for now, but historical observations (see movie loop at http://ocgweb.marine.usf.edu under Products, 2nd line down) show that these eddies often reattach.

Subsurface Trajectories (4/20-6/1)

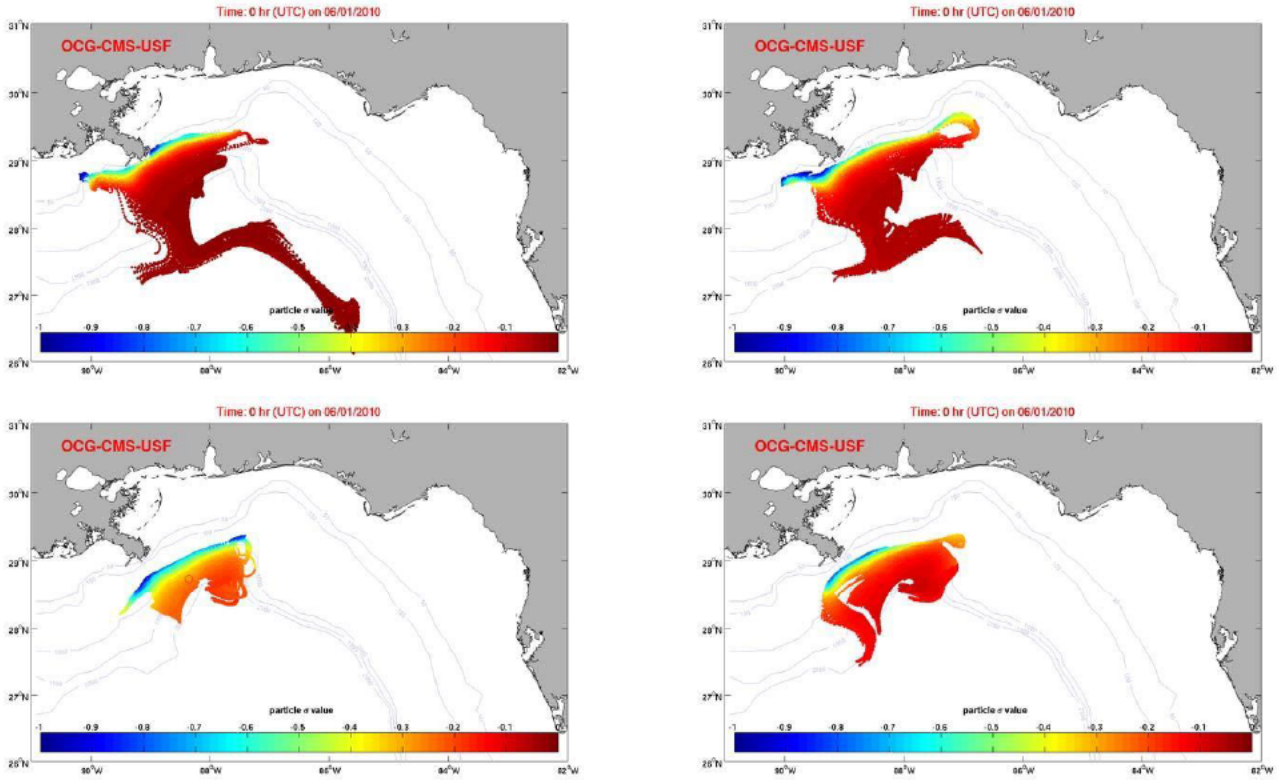
http://ocgweb.marine.usf.edu



Subsurface trajectories estimated for the period 4/20 to 6/1. Clockwise from the upper left are virtual particles released at 1400m, 1200m, 100m and 800m and tracked in 3-D using the USF regional model consisting of ROMS nested in HYCOM. Deep trajectories tend to follow isobaths.

Subsurface Trajectories (4/20-6/1)

http://ocgweb.marine.usf.edu



Subsurface trajectories estimated for the period 4/20 to 6/1. Clockwise from the upper left are virtual particles released at 50m, 100m, 200m and 400m and tracked in 3-D using the USF regional model consisting of ROMS nested in HYCOM. Subsurface trajectories are broader toward the surface due to density effects and wind forcing.

Summary

Over the past two weeks the LC underwent a process of eddy shedding, altering the pathway of the flow of oil. While a small amount of oil is likely in the Florida Straits by now, other oil entrained in the LC may be circulating around the eddy, versus taking a more direct path toward the Florida Straits.

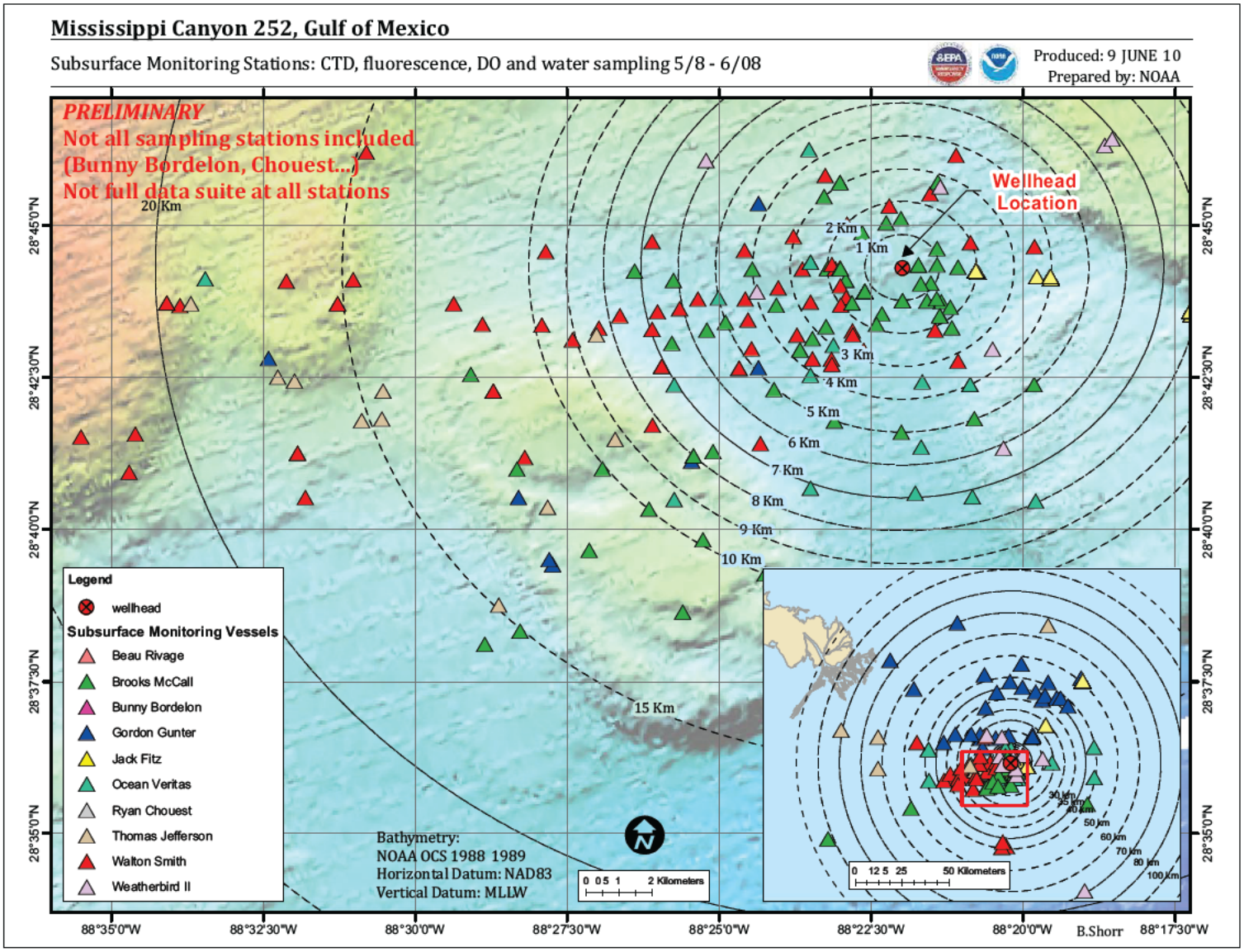
While the shedding of a LC eddy may be good news, historical observations show that these eddies can reconnect, and the satellite images over the past few days suggest that this may be happening.

The main body of the oil remains near the well site. Based on the 5/28 re-initialization of oil location, it does not appear that surface oil will reach any Florida shorelines over the next several days.

Given heightened concerns from subsurface oil observations, we call your attention to subsurface trajectory analyses also available at the web site given below. The subsurface trajectories were initiated on 4/20 and they continue with the release of new virtual particles each day. A concern for subsurface oil is whether or not it will upwell across the shelf break and onto the continental shelf (and sensitive fishing grounds) from where it could be transported along the bottom to the nearshore.

For the near-term, the evolution of the LC (whether or not the eddy reattaches) and the location of subsurface oil are two major concerns.

Observations, models, analyses at: http://ocgweb.marine.usf.edu and http://optics.marine.usf.edu/events/GOM_rigfire with contributions from HYCOM consortium.


Mississippi Canyon 252, Gulf of Mexico
Subsurface Monitoring Stations: CTD, fluorescence, DO and water sampling 5/8 - 6/08
Produced: 9 JUNE 10
Prepared by: NOAA
PRELIMINARY
Not all sampling stations included
(Bunny Bordelon, Chouest...)
Not full data suite at all stations
Wellhead Location
20 Km
15 Km
10 Km
9 Km
8 Km
7 Km
6 Km
5 Km
4 Km
3 Km
2 Km
1 Km
Legend
wellhead
Subsurface Monitoring Vessels
Beau Rivage
Brooks McCall
Bunny Bordelon
Gordon Gunter
Jack Fitz
Ocean Veritas
Ryan Chouest
Thomas Jefferson
Walton Smith
Weatherbird II
Bathymetry:
NOAA OCS 1988 1989
Horizontal Datum: NAD83
Vertical Datum: MLLW
0 0.5 1 2 Kilometers
0 12.5 25 50 Kilometers
28°45'0"N
28°42'30"N
28°40'0"N
28°37'30"N
28°35'0"N
88°35'0"W
88°32'30"W
88°30'0"W
88°27'30"W
88°25'0"W
88°22'30"W
88°20'0"W
88°17'30"W
B.Shorr

Interim I

		Oregon II	Gordon Gunter	P sces	Delaware II	Henry B Bige ow	Nancy Foster Alt #1	Thomas Jefferson	Ronald H Brown	USNS Pathfinder	
W	#####	DWH Seafood	repairs and Flt	WH Seep C eanswee p	Atl Shark/ Snapper			KW Survey	drydock		
Th	#####	DWH Seafood	repairs and Flt	WH Seep C eanswee p	Arrive Woods			KW Survey	drydock		
F	#####	DWH Seafood	repairs and Flt	arrive Pascagoula		Depart Pascagoula	depart Pascagoul	KW Survey	drydock		
Sa	#####	DWH Seafood	repairs and Flt			WH Seep Cleansweep	RACOW	KW Survey	drydock		
Su	#####	DWH Seafood	repairs and Flt			WH Seep Cleansweep	RACOW	KW Survey	drydock		
M	#####	DWH Seafood	repairs and Flt		Depart Woods	WH Seep Cleansweep	RACOW	KW Survey	drydock		
T	#####	DWH Seafood	repairs and Flt		ECOMON	WH Seep Cleansweep	RACOW	KW Survey	drydock		
W	#####	DWH Seafood	repairs and Flt	Depart Pascagoula	ECOMON	WH Seep Cleansweep	RACOW	KW Survey	drydock		
Th	#####	DWH Seafood	repairs and Flt	Operation Oil Search	ECOMON	WH Seep Cleansweep	RACOW	KW Survey	drydock		
F	#####	DWH Seafood	repairs and Flt	Operation Oil Search	ECOMON	WH Seep Cleansweep	RACOW	Arrive Key West	drydock		1
Sa	#####	DWH Seafood	repairs and Flt	Operation Oil Search	ECOMON	9 Arr ve Key West	RACOW		drydock		2
Su	#####	arrive Pascagoula	repairs and Flt	Operation Oil Search	ECOMON	depart Key West	RACOW		drydock		3
M	#####		repairs/ Flt Inspection	Operation Oil Search	ECOMON		Arr/Destage	Depart Key West	drydock		4
T	#####		Depart Plankton	Operation Oil Search	ECOMON		Fuel Depart	KW Survey	drydock		5
W	#####		Plankton	Operation Oil Search	ECOMON		Reef Fish Transit	KW Survey	drydock		6
Th	#####		Plankton	Operation Oil Search	ECOMON		Reef Fish Transit	KW Survey	drydock		7
F	#####		Plankton	Operation Oil Search	ECOMON		Reef Fish Transit	KW Survey	drydock		8
Sa	#####		Plankton	Operation Oil Search	ECOMON	Arrive Newport RI	Reef Fish Transit	KW Survey	drydock		9
Su	#####		Plankton	Operation Oil Search	ECOMON		Arrive Charlesto	KW Survey	drydock		10
M	#####	Depart Pascagoula	Plankton	Operation Oil Search	ECOMON		DONSA/light duty	KW Survey	drydock		11
T	#####	DWH Seafood	Plankton	Operation Oil Search	ECOMON		DONSA/light duty	Arrive Norfolk	drydock		12
W	1 Sep	DWH Seafood	Plankton	Operation Oil Search	Arrive Woods		DONSA/light duty		drydock		13
Th	2 Sep	DWH Seafood	Plankton	16 Arrive Pascagoula			Stage ARF		drydock		14
F	3 Sep	DWH Seafood	Plankton				Depart Charlesto		drydock		15
Sa	4 Sep	DWH Seafood	Plankton			Depart Newport RI	Atl Reef Fish 1		drydock		16
Su	5 Sep	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 1		Sea Trials		17
M	6 Sep	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 1		Multibeam Patch Test		18
T	7 Sep	DWH Seafood	Plankton	Depart Pascagoula		Autumn Trawl Leg 1	Atl Reef Fish 1		Multibeam Patch Test	Depart Pascagoul	19
W	8 Sep	DWH Seafood	Plankton	Operation Oil Search	Depart Woods	Autumn Trawl Leg 1	Atl Reef Fish 1		Multibeam Patch Test	Operation Oil Search	20
Th	9 Sep	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 1	Depart Norfolk	Multibeam Patch Test	Operation Oil Search	21
F	#####	DWH Seafood	19 Arrive Pascagoula	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Arrive Charlesto	Chesapeake Survey		Operation Oil Search	22
Sa	#####	arrive Galveston		Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	DONSA	Chesapeake Survey	Depart Charleston	Operation Oil Search	23
Su	#####			Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	DONSA	Chesapeake Survey	Operation O I Search	Operation Oil Search	24
M	#####	Depart Galveston		Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Depart Charlesto	Chesapeake Survey	Operation O I Search	Operation Oil Search	25
T	#####	DWH Seafood		Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	Operation Oil Search	26
W	#####	DWH Seafood	Depart Plankton	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	Operation Oil Search	27
Th	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	Operation Oil Search	28
F	#####	DWH Seafood	Plankton	27 Arrive Pascagoula	Arrive Woods	Autumn Trawl Leg 1	Atl Reef Fish 2	Arrive Norfolk	Operation O I Search	Operation Oil Search	29
Sa	#####	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 2		Operation O I Search	Operation Oil Search	30
Su	#####	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 2		Operation O I Search	Operation Oil Search	31
M	#####	DWH Seafood	Plankton		Depart Woods	Arrive Newport RI	Atl Reef Fish 2	Depart Norfolk	Operation O I Search	Operation Oil Search	32
T	#####	DWH Seafood	Plankton	Depart Pascagoula	Herring Leg 2		Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	15 OOS Arr vel	33
W	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2		Atl Reef Fish 2	Chesapeake Survey	Operation O I Search		34
Th	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2		Atl Reef Fish 2	Chesapeake Survey	Operation O I Search		35
F	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Depart Newport	Arrive Charlesto	Chesapeake Survey	Operation O I Search		36
Sa	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	DONSA	Chesapeake Survey	15 Fate of O I	Operation Oil Search	37
Su	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	DONSA	Chesapeake Survey		Operation Oil Search	38
M	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Depart Charlesto	Chesapeake Survey		Operation Oil Search	39
T	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Atl Reef Fish 3	Chesapeake Survey	Operation O I Search	Operation Oil Search	40
W	#####	arrive Pascagoula	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Atl Reef Fish 3	Chesapeake Survey	Operation O I Search	Operation Oil Search	41
Th	#####		35 Arrive Pascagoula	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Atl Reef Fish 3	Chesapeake Survey	Operation O I Search	Operation Oil Search	42
F	1 Oct			38 Arrive Pascagoula	Arrive Woods	Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	43
Sa	2 Oct					Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	44
Su	3 Oct					Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	45
M	4 Oct				Depart Woods	Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	46
T	5 Oct				Herring Leg 3		Atl Reef Fish 3		Operation O I Search	26 OOS Arr	47
W	6 Oct		Depart Pascagoula		Herring Leg 3		Atl Reef Fish 3		Operation O I Search		48
Th	7 Oct	Depart Pascagoula	Operation Oil Search	Depart Pascagoula	Herring Leg 3		Atl Reef Fish 3		Operation O I Search		49
F	8 Oct	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Atl Reef Fish 3		Operation O I Search	Depart Pascagoul	50
Sa	9 Oct	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Atl Reef Fish 3		27 OOS Arr ve	Operation Oil Search	51
Su	10 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Arrive Charlesto			Operation Oil Search	52
M	11 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Destage ARF			Operation Oil Search	53
T	12 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	DONSA/light duty		Depart Key West	Operation Oil Search	54
W	13 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	DONSA/light duty		WBTS	Operation Oil Search	55
Th	14 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Stage Lionf sh		WBTS	Operation Oil Search	56
F	15 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Arrive Woods Ho e	Autumn Trawl Leg 3	Depart Charlesto n		WBTS	Operation Oil Search	57
Sa	16 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal		Autumn Trawl Leg 3	Lion Fish Survey		WBTS	Operation Oil Search	58
Su	17 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal		Autumn Trawl Leg 3	Lion Fish Survey		WBTS	Operation Oil Search	59
M	18 Oc	SM Fall trawl Bottomfish	13 Arrive?	Small Pelagic Trawl Cal	Depart Woods Ho e	Autumn Trawl Leg 3	Lion Fish Survey		WBTS	37 Arrive?	60
			13	38		9			27	37	
		NOAA Navy	94/87 DAS 37 DAS								

Received(Date): Fri, 20 Aug 2010 13:33:48 -0500
From: Andrew David <Andy.David@noaa.gov>
Subject: Fwd: [Fwd: MOC-A vessel support for Operation Oil Search]
To: guy Davenport <Guy.Davenport@noaa.gov>
MOC ships Operation Oil Search 20AUG.xlsx
Attached Message Part

-------- Original Message --------

Subject: [Fwd: MOC-A vessel support for Operation Oil Search]
Date: Fri, 20 Aug 2010 09:35:31 -0400
From: Tim Battista <Tim.Battista@noaa.gov>
To: Greg Piniak <Greg.Piniak@noaa.gov>, Paula Whitfield <Paula.Whitfield@noaa.gov>, Liz Fairey <Liz.Fairey@noaa.gov>, John Tomczuk <John.Tomczuk@noaa.gov>, 'Andy David' <Andy.David@noaa.gov>, Mark Monaco <Mark.Monaco@noaa.gov>, Tom Hourigan <Tom.Hourigan@noaa.gov>

First cut look at this has some highs an lows.

Paula, Anecdotally I heard you lost the FY10 Lionfish days and they moved you FY11 days to October on NF.

Andy, John, and Tom: Looks like we lost the MPA Mapping Deep Coral days allocated for Andy David. Not sure about about my DC days as the schedule doesn't project that far. Indications are that RB DC days are still a go.

Liz and Tom, CRCP DC are getting the raw end of the deal. Lost my August DC cruise and now Andy D. DC cruise.

TB

Original Message
Subject: MOC A vessel support for Operation Oil Search
Date: Fri, 20 Aug 2010 08:41:33 0400
From: Rusty Brainard <Rusty.Brainard@noaa.gov>
To: David Kennedy <David.Kennedy@noaa.gov>, Janet Baran <Janet.Baran@noaa.gov>, "sam.walker@noaa.gov" <Sam.Walker@noaa.gov>, "steve.murawski@noaa.gov" <Steve.Murawski@noaa.gov>, Philip M Kenul <Philip.M.Kenul@noaa.gov>, Randy TeBeest <Randy.J.Tebeest@noaa.gov>, Craig.Mclean@noaa.gov
CC: Nicole Le Boeuf <Nicole.Leboeuf@noaa.gov>, "dave.westerholm@noaa.gov" <Dave.Westerholm@noaa.gov>, Jen Pizza <Jen.Pizza@noaa.gov>, Robert Haddad <Robert.Haddad@noaa.gov>, "steven.gallagher@noaa.gov" <Steven.Gallagher@noaa.gov>, "jennifer.werner@noaa.gov" <Jennifer.Werner@noaa.gov>, "ChiefOps.MOA" <ChiefOps.MOA@noaa.gov>, "CO MOC. Atlantic" <CO.MOC.Atlantic@noaa.gov>, Robin Brake <robin.brake@navy.mil>, Rusty Brainard <Rusty.Brainard@noaa.gov>, Bill O'Clock <James.W.O'Clock@noaa.gov>,

Alexandra Von Saunder <Alexandra.Vonsaunder@noaa.gov>, Chris Beaverson <Chris.Beaverson@noaa.gov>, Mark Monaco <Mark.Monaco@noaa.gov>, Bonnie Ponwith <Bonnie.Ponwith@noaa.gov>, Chuck Byrne <Charles.Byrne@noaa.gov>, Mark Friese <Mark.Friese@noaa.gov>, Allen Shimada <Allen.Shimada@noaa.gov>, Ricardo Ramos <Ricardo.Ramos@noaa.gov>, Tim Battista <Tim.Battista@noaa.gov>, "Perry A. Thompson" <Perry.A.Thompson@noaa.gov>, _DWH Science Box <DWH.Science.Box@noaa.gov>
References: <2d1a672d1112.2d11122d1a67@noaa.gov> <5AF717FF_BE69_4B38_9EE2_816DA9E7F636@noaa.gov> <4C6A9998.7050301@noaa.gov> <FE9E4286_0408_4D46_8D61_34C72FAECCA8@noaa.gov>

Aloha All,
Attached is the latest version of the DRAFT NOAA MOC A vessel support for Operation Oil Search (OOS) and other high priority NOAA missions through October 18th, the approximate end of OOS. Based on guidance from DWH leadership, this plan attempts to maintain a strong, though certainly not exclusive, NOAA presence throughout OOS. Regrettably, but necessarily, this plan involves many compromises to other important NOAA missions. For most of the 60 day period, two NOAA vessels will be supporting OOS. There are some short periods, particularly during the beginning, where OOS support is limited to one vessel (PISCES), though two other vessels (OREGON II and GUNTER) also supporting DWH missions. This plan incorporates RON BROWN and a Navy T AGS60 as soon as those vessels become available. With there unique capabilities to continuously support full depth water sampling, profiling, sediment coring and sampling, ROV/AUV/gliders, and sufficient lab spaces for large contingents of scientists from NOAA, other Federal agencies (USGS, EPA, Navy, NSF, and others), and academics. We are continuing trying to identify replacement vessels to support some of the important NOAA missions impacted by these diversions of NOAA vessels to support DWH and OOS. We appreciate the many inputs and efforts across the Line Offices and particularly within OMAO to help develop this draft plan.

Sam and Janet,
We'll need to work closely together to integrate the OOS Strategic Plan and this vessel support plan to optimize operational planning across the many agencies involved and with the vessel support staff who are anxious to learn more about their upcoming activities. Have there been any updates on the request for the Navy T AGS60 since I submitted the draft memo and CG form 213 a couple of days ago? It is important to get the T AGS60 mobilized as soon as possible to help support Oil Search. The attached plan has a very optimistic start date for the T AGS60 of Sept 7th. Further slides in those dates will likely further increase impacts to other important NOAA missions.

Please let me know if you have any questions or have suggestions for improving this draft plan. It is important that a final plan goes out to the fleet and programs as soon as possible to give all of the folks involved as much time as possible to prepare for or alter their upcoming missions.

Best regards, Rusty

		Oregon II	Gordon Gunter	P sces	Delaware II	Henry B Bige ow	Nancy Foster Alt #1	Thomas Jefferson	Ronald H Brown	USNS Pathfinder	
W	#####	DWH Seafood	repairs and Flt	WH Seep C eansweep	Atl Shark/ Snapper			KW Survey	drydock		
Th	#####	DWH Seafood	repairs and Flt	WH Seep C eansweep	Arrive Woods			KW Survey	drydock		
F	#####	DWH Seafood	repairs and Flt	arrive Pascagoula		Depart Pascagoula	depart Pascagoul	KW Survey	drydock		
Sa	#####	DWH Seafood	repairs and Flt			WH Seep Cleansweep	RACOW	KW Survey	drydock		
Su	#####	DWH Seafood	repairs and Flt			WH Seep Cleansweep	RACOW	KW Survey	drydock		
M	#####	DWH Seafood	repairs and Flt		Depart Woods	WH Seep Cleansweep	RACOW	KW Survey	drydock		
T	#####	DWH Seafood	repairs and Flt		ECOMON	WH Seep Cleansweep	RACOW	KW Survey	drydock		
W	#####	DWH Seafood	repairs and Flt	Depart Pascagoula	ECOMON	WH Seep Cleansweep	RACOW	KW Survey	drydock		
Th	#####	DWH Seafood	repairs and Flt	Operation Oil Search	ECOMON	WH Seep Cleansweep	RACOW	KW Survey	drydock		
F	#####	DWH Seafood	repairs and Flt	Operation Oil Search	ECOMON	WH Seep Cleansweep	RACOW	Arrive Key West	drydock		1
Sa	#####	DWH Seafood	repairs and Flt	Operation Oil Search	ECOMON	9 Arr ve Key West	RACOW		drydock		2
Su	#####	arrive Pascagoula	repairs and Flt	Operation Oil Search	ECOMON	depart Key West	RACOW		drydock		3
M	#####		repairs/ Flt Inspection	Operation Oil Search	ECOMON		Arr/Destage	Depart Key West	drydock		4
T	#####		Depart Plankton	Operation Oil Search	ECOMON		Fuel Depart	KW Survey	drydock		5
W	#####		Plankton	Operation Oil Search	ECOMON		Reef Fish Transit	KW Survey	drydock		6
Th	#####		Plankton	Operation Oil Search	ECOMON		Reef Fish Transit	KW Survey	drydock		7
F	#####		Plankton	Operation Oil Search	ECOMON		Reef Fish Transit	KW Survey	drydock		8
Sa	#####		Plankton	Operation Oil Search	ECOMON	Arrive Newport RI	Reef Fish Transit	KW Survey	drydock		9
Su	#####		Plankton	Operation Oil Search	ECOMON		Arrive Charlesto	KW Survey	drydock		10
M	#####	Depart Pascagoula	Plankton	Operation Oil Search	ECOMON		DONSA/light duty	KW Survey	drydock		11
T	#####	DWH Seafood	Plankton	Operation Oil Search	ECOMON		DONSA/light duty	Arrive Norfolk	drydock		12
W	1 Sep	DWH Seafood	Plankton	Operation Oil Search	Arrive Woods		DONSA/light duty		drydock		13
Th	2 Sep	DWH Seafood	Plankton	16 Arrive Pascagoula			Stage ARF		drydock		14
F	3 Sep	DWH Seafood	Plankton				Depart Charlesto		drydock		15
Sa	4 Sep	DWH Seafood	Plankton			Depart Newport RI	Atl Reef Fish 1		drydock		16
Su	5 Sep	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 1		Sea Trials		17
M	6 Sep	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 1		Multibeam Patch Test		18
T	7 Sep	DWH Seafood	Plankton	Depart Pascagoula		Autumn Trawl Leg 1	Atl Reef Fish 1		Multibeam Patch Test	Depart Pascagoul	19
W	8 Sep	DWH Seafood	Plankton	Operation Oil Search	Depart Woods	Autumn Trawl Leg 1	Atl Reef Fish 1		Multibeam Patch Test	Operation Oil Search	20
Th	9 Sep	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 1	Depart Norfolk	Multibeam Patch Test	Operation Oil Search	21
F	#####	DWH Seafood	19 Arrive Pascagoula	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Arrive Charlesto	Chesapeake Survey		Operation Oil Search	22
Sa	#####	arrive Galveston		Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	DONSA	Chesapeake Survey	Depart Charleston	Operation Oil Search	23
Su	#####			Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	DONSA	Chesapeake Survey	Operation O I Search	Operation Oil Search	24
M	#####	Depart Galveston		Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Depart Charlesto	Chesapeake Survey	Operation O I Search	Operation Oil Search	25
T	#####	DWH Seafood		Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	Operation Oil Search	26
W	#####	DWH Seafood	Depart Plankton	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	Operation Oil Search	27
Th	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 1	Autumn Trawl Leg 1	Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	Operation Oil Search	28
F	#####	DWH Seafood	Plankton	27 Arrive Pascagoula	Arrive Woods	Autumn Trawl Leg 1	Atl Reef Fish 2	Arrive Norfolk	Operation O I Search	Operation Oil Search	29
Sa	#####	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 2		Operation O I Search	Operation Oil Search	30
Su	#####	DWH Seafood	Plankton			Autumn Trawl Leg 1	Atl Reef Fish 2		Operation O I Search	Operation Oil Search	31
M	#####	DWH Seafood	Plankton		Depart Woods	Arrive Newport RI	Atl Reef Fish 2	Depart Norfolk	Operation O I Search	Operation Oil Search	32
T	#####	DWH Seafood	Plankton	Depart Pascagoula	Herring Leg 2		Atl Reef Fish 2	Chesapeake Survey	Operation O I Search	15 OOS Arr vel	33
W	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2		Atl Reef Fish 2	Chesapeake Survey	Operation O I Search		34
Th	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2		Atl Reef Fish 2	Chesapeake Survey	Operation O I Search		35
F	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Depart Newport	Arrive Charlesto	Chesapeake Survey	Operation O I Search		36
Sa	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	DONSA	Chesapeake Survey	15 Fate of O I	Operation Oil Search	37
Su	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	DONSA	Chesapeake Survey		Operation Oil Search	38
M	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Depart Charlesto	Chesapeake Survey		Operation Oil Search	39
T	#####	DWH Seafood	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Atl Reef Fish 3	Chesapeake Survey	Operation O I Search	Operation Oil Search	40
W	#####	arrive Pascagoula	Plankton	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Atl Reef Fish 3	Chesapeake Survey	Operation O I Search	Operation Oil Search	41
Th	#####		35 Arrive Pascagoula	Operation Oil Search	Herring Leg 2	Autumn Trawl Leg 2	Atl Reef Fish 3	Chesapeake Survey	Operation O I Search	Operation Oil Search	42
F	1 Oct			38 Arrive Pascagoula	Arrive Woods	Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	43
Sa	2 Oct					Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	44
Su	3 Oct					Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	45
M	4 Oct				Depart Woods	Autumn Trawl Leg 2	Atl Reef Fish 3		Operation O I Search	Operation Oil Search	46
T	5 Oct				Herring Leg 3		Atl Reef Fish 3		Operation O I Search	26 OOS Arr	47
W	6 Oct		Depart Pascagoula		Herring Leg 3		Atl Reef Fish 3		Operation O I Search		48
Th	7 Oct	Depart Pascagoula	Operation Oil Search	Depart Pascagoula	Herring Leg 3		Atl Reef Fish 3		Operation O I Search		49
F	8 Oct	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Atl Reef Fish 3		Operation O I Search	Depart Pascagoul	50
Sa	9 Oct	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Atl Reef Fish 3		27 OOS Arr ve	Operation Oil Search	51
Su	10 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Arrive Charlesto			Operation Oil Search	52
M	11 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Destage ARF			Operation Oil Search	53
T	12 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	DONSA/light duty		Depart Key West	Operation Oil Search	54
W	13 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	DONSA/light duty		WBTS	Operation Oil Search	55
Th	14 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Herring Leg 3	Autumn Trawl Leg 3	Stage Lionf sh		WBTS	Operation Oil Search	56
F	15 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal	Arrive Woods Ho e	Autumn Trawl Leg 3	Depart Charlesto n		WBTS	Operation Oil Search	57
Sa	16 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal		Autumn Trawl Leg 3	Lion Fish Survey		WBTS	Operation Oil Search	58
Su	17 Oc	SM Fall trawl Bottomfish	Operation Oil Search	Small Pelagic Trawl Cal		Autumn Trawl Leg 3	Lion Fish Survey		WBTS	Operation Oil Search	59
M	18 Oc	SM Fall trawl Bottomfish	13 Arrive?	Small Pelagic Trawl Cal	Depart Woods Ho e	Autumn Trawl Leg 3	Lion Fish Survey		WBTS	37 Arrive?	60
			13	38		9			27	37	
		NOAA Navy	94/87 DAS 37 DAS								

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Russell E. Brainard, Ph.D.
Acting Detail to DWH Science Box
SSMC Bldg 3, Room 12539
301 713 2367 x162; mobile 808 348 3760

Chief, Coral Reef Ecosystem Division
Pacific Islands Fisheries Science Center
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1601 Kapiolani Boulevard, Suite 1110
Honolulu, Hawaii 96814
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http://www.pifsc.noaa.gov/cred/
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On Aug 17, 2010, at 5:28 PM, Rusty Brainard wrote:

> Aloha Janet,
> Attached is the completed ICS-213 for review and discussion at the Unified Command. As I have not seen the Strategic Plan, it probably makes most sense to have the specific cruise plan developed from that at your end by the SMU. LIkewise, I am assuming the Navy will provide the how much (people, equipment, and travel), though we do know that the vessel and all of her equipment, and all of the ship's crew and technician's will be required for the duration of the request (on scene Sept. 7 - Oct. 18). I don't know what this translates into in Navy terms.
>
> Please let me know what else you need. Best regards, Rusty
>
> <ICS-213 NOAA 17Aug10.xlsx>
>
> On Aug 17, 2010, at 10:15 AM, Janet Baran wrote:
>
> > Rusty,
> >
> > After speaking to the Navy reps and Coast Guard at Area Command, we have determined the method forward for submitting this request. I also spoke with Robin Brake from the Navy and this also is her understanding of the way forward.

I will need the following documents from you to move this request forward.

* Full development of a Resource Requirement Message (Form 213). A

blank one is attached. o a. 1

o b., c. no need to fill in

o d. U

o e. Capability required (the what), Reason for Capability

(the why), Duration, and how much(will need to be broken

down from people, equipment and travel). One paragraph each

o f. location can simply be "Gulf of Mexico"

* Supporting documents

o Cruise plan

o Signed Directive and plan (Environmental Unit will provide)

o Anything else. The Coast Guard officer I spoke with

suggested extensive backup material.

After you get me all of that material, I work in Unified Area Command to move this forward. It will need to be signed by the Planning Chief. After that it will go to the RRM group, who will prepare the memo for the Admiral (Federal On Scene Coordinator - FOSC) here to sign off on. He will need to approve the request based upon the requirements that call for use of the vessel. RADM Zukunft will need to approve this request before he sends to the Navy/Secretary of Defense.

The Navy officers here can help develop the costs, but I will need to know more details for the vessel plan.

As you know, time is of the essence. We will not be able to submit this request until the strategic plan is finished, with is due COB Weds. Please let me know when you will be able to get all of this

material to me, so I can help prepare all the people we will need to work with.

I'm happy to answer any questions. My cell is 202-536-8619.

Best,

Janet

--

Janet Baran, Ph.D.

Subsurface Science Coordinator

Subsurface Monitoring Unit: Environmental Unit

202-536-8619

Rusty Brainard wrote:

> Aloha Nicole,
>
> Thanks so much for the follow-through with the memo. That sounds like a reasonable plan.
>
> Regarding your 2nd paragraph, I'm pretty certain that during last week's call that the fleet leadership team concluded that we need the Navy vessel to satisfy this directive and that we should move the request letter forward even as the more complete strategic plan is being developed.
>
> I am presently working up several options to engage NOAA ships (PC, NF, RB) and the Navy T-AGS60 and the larger Strategic Planning team are working across NSF and the other Federal agencies. From the NOAA side, I'm trying to keep a NOAA presence throughout the 60-day period, but also retain NOAA's ability to keep highest priority mandated or politically-sensitive NOAA missions on track. Though the plan will have to adapt once the strategic plan is finalized, I should have a draft for folks to pick apart by tomorrow.

Thanks again, Rusty

On Aug 16, 2010, at 5:25 PM, Nicole.Leboeuf@noaa.gov wrote:

> Thanks for this, Rusty.
>
> I have asked Janet Baran working with Sam at Area Command to reach out to the USCG's Liaison with the Navy for all things DWH to confirm that this memo is indeed the appropriate channel through which to engage them. Given that the directive is to be carried out by Adm. Z, I suspect that this person will know best which channels the request goes through. I have, however, let Janet know that you have been working directly with Robin Brake and have asked her to make the person in UAC aware of that so that we're all on the same page with the USCG-Navy connection and that the USCG is aware of the guidance that Robin has given you.
>
> Also, the draft memo references that "...NOAA has already determined that this comprehensive effort to monitor sub-surface oil and dispersant will require vessel assets and capabilities beyond the capacity of NOAAs internal fleet." I suspect, and perhaps Janet can help get us specific guidance on this, that the USCG is going to need a more detailed write up as a case for bringing in the Navy vessel. Are you still working that up? Is there anything more that you need to do that? Please feel free to ring Janet as

needed. She's ready to assist.

Regards, Nicole

----- Original Message -----

From: Rusty Brainard <Rusty.Brainard@noaa.gov>

Date: Monday, August 16, 2010 9:24 am

Subject: Re: meeting on Clean Sweep and NOAA role

> Good morning Nicole, David, and others,
>
> Please review, edit, or provide additional guidance on the attached draft NOAA memo to the USCG requesting the Navy T-AGS60. I'm not sure who this memorandum should be signed by in the from line. I also wasn't sure whether the Directive is 16541 or not (both highlighted in yellow). I'm not sure who will transfer this to letterhead for signature, but assume that will be someone else. Regarding Nicole's note about sending it to the Secretary of the Navy, I've been advised explicitly to make the request

directly to the Secretary of Defense and that is what they are expecting.

Thanks, Rusty

On Aug 13, 2010, at 9:15 AM, Nicole LeBoeuf wrote:

> Hey Rusty,
>
> As soon as you've got a draft to look at, let's work togethe r to

ensure that all documents are consistent with and complementary to one another.

> I see the need for four docum ents to make this happen . Each

feeds the other in sequential order.

One - the NIC directive to do the work written by the USCG.

Two - a NOAA memo to the USCG outlining our plans for

implementing the directive, including the availability of relevant NOAA assets to carry out the directive. This is where we indicate that NOAA assets will be maxed out and that we recommend the USCG requesting use of the Navy vessel for these activities. This may be what you are working on now.

Three - memo from the USCG

to the Secretary of Defense (or Navy

as the USCG has advised me - I will seek clarification) requesting the use of the Navy vessel using the specifications we provided in our memo to the USCG. Perhaps Roger Parson can assist with this.

Four - our statement of work including a cost estimate that we

will submit as our PRFA request, appending the other documents as background and rationale. This is the document I'll draft with assistance from others on the cost estimate. Who should I work with on that?

I can begin reaching out

to the USCG now re: the processes and

mechanisms for making this request of the Navy and potentially the USCG reimbursing the Navy directly. I am also happy to help get the PRFA request thru the UAC when ready.

Other thoughts on documents or required process steps?

Thanks,
Nicole

From: Rusty Brainard <Rusty.Brainard@noaa.gov> To: David Kennedy <David.Kennedy@n

oaa.gov> Cc: Nicole Le Boeuf <Nicole.Leboeuf@noaa.gov>; Dave Westerholm

<Dave.Westerholm@noaa.gov>; Philip M Kenul <Philip.M.Kenul@noaa.gov>; Steve Murawski <Steve.Murawski@noaa.gov>; Sam Walker <Sam.Walker@noaa.gov>; Jen Pizza <Jen.Pizza@noaa.gov>; Robert Haddad <Robert.Haddad@noaa.gov>; Steven Gallagher <Steven.Gallagher@noaa.gov>

Sent: Thu Aug 12 17:58:42 2010

Subject: Re: meeting on Clean Sweep and NOAA

role

Aloha
David
et al.,

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notifie
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Robin
Brake
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Navy
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on of
our

intentions to request the Navy T-AGS60 as we discussed. I indicated that our intention is to move this request to the Coast Guard shortly after the NIC Directive is finalized. She indicated that sooner is better than later from the Navy's perspective. She recommended requesting 60 days to allow us the maximum flexibility. If we need less in the end, the vessel can always depart early and return to Navy duties. She indicated again that the request from the FOSC should be directed to the Secretary of Defense at the following address:

Dr. Robert M. Gates

Secretary of Defense

1000 Defense Pentagon

Washington DC 20301-1000

She indicated that they only need a 1-2 pager outlining the general mission objectives. I am working on a draft now for your consideration. I am not familiar with the process of moving this to the Unified Command and assume that will come from one of you.

Please advise.

-Rusty

On Aug 10, 2010, at 12:48 PM, David Kennedy wrote:

> The NIC is drafting a new plan for Cle

answersteroids

throughout the afternoon and should have a directive on the new plan by the end of the day. My thought is that we convene the NOAA group tomorrow morning. Any other thoughts on that?
dmk

<ICS-213.xlsx>